

BIDDING REQUIREMENTS, CONTRACT DOCUMENTS

and

TECHNICAL SPECIFICATIONS

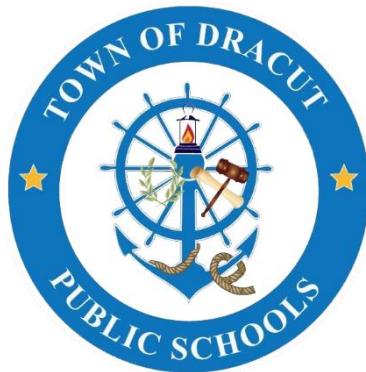
FOR THE CONSTRUCTION OF THE

PEDESTRIAN SAFETY & TRAFFIC CIRCULATION IMPROVEMENTS PROJECT

for the

**Dracut Public Schools
Town of Dracut, Massachusetts**

APRIL 19, 2022

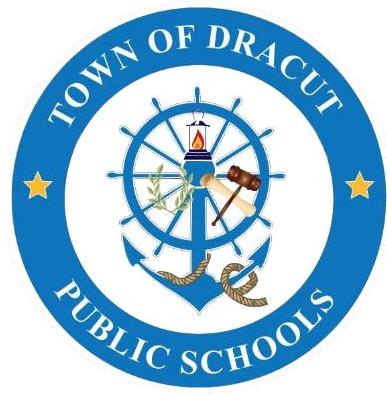


Prepared by:



50 High Street, Suite 49
North Andover, Massachusetts 01845





**SPECIFICATIONS FOR CONSTRUCTION OF THE
PEDESTRIAN SAFETY & TRAFFIC CIRCULATION IMPROVEMENTS PROJECT**

**DRACUT PUBLIC SCHOOLS
TOWN OF DRACUT, MASSACHUSETTS**

Prepared By

**HOYLE, TANNER & ASSOCIATES, INC.
50 High Street, Suite 49
North Andover, Massachusetts 01845**

**Date of Issue
April 19, 2022**

ADVERTISEMENT FOR BIDS
TOWN OF DRACUT
DRACUT PUBLIC SCHOOLS
DRACUT, MASSACHUSETTS
PEDESTRIAN SAFETY & TRAFFIC CIRCULATION IMPROVEMENTS PROJECT

General Notice

The Town of Dracut (Owner) is requesting Bids for the construction of the following Project:

The Pedestrian Safety & Traffic Circulation Improvements Project
21.926301.00

Bids for the construction of the Project will be received at the **Dracut Town offices, Attn: Barbara O'Connor**, located at **62 Arlington Street, Dracut, MA 01826**, until **Friday, May 20, 2022 at 11:00am** local time. At that time the Bids received will be **publicly** opened and read.

The Project includes the following Work:

Construction of the reconfiguration of the existing parking areas driveways, access points, crosswalks, bus/parent drop off locations, landscaping, new greenspace, recess areas, playground upgrades and repaving.

Bids are requested for the following Contract: **The Pedestrian Safety & Traffic Circulation Improvements Project / 21.926301.00**

The project is being bid as MGL 30, §39. Owner anticipates that the Project's total base bid price will be approximately \$1.3 million dollars. The Project base bid has an expected duration of **65** days with additional time for alternates to be completed.

Obtaining the Bidding Documents

The Issuing Office for the Bidding Documents is:

Accent Blueprinting
99 Chelmsford Road, (Rear #13)
No. Billerica 01862
www.accentblueprints.com
Tel: 978.362.8038

Prospective Bidders may obtain or examine the Bidding Documents on or after April 19, 2022 at the Issuing Office website listed above, and may obtain printed copies of the Bidding Documents from the Issuing Office as for a fee. Shipping via UPS is an additional cost. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office.

Pre-bid Conference

A mandatory pre-bid conference for the Project will be held on **Tuesday, April 26, 2022 at 10:00am** at the **Dracut Public High School parking lot across from Englesby Elementary, 1540 Lakeview Avenue, Dracut, MA 01826**. Bids will not be accepted from Bidders that do not attend the mandatory pre-bid conference.

Instructions to Bidders.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **Town of Dracut**

By: **Barbara O'Connor**

Title: **Purchasing Agent**

Date: **April 14th, 2022 on Central Register**

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

| | Page |
|--|------|
| Article 1— Defined Terms..... | 1 |
| Article 2— Bidding Documents | 1 |
| Article 3— Qualifications of Bidders | 2 |
| Article 4— Pre-Bid Conference | 2 |
| Article 5— Site and Other Areas; Existing Site Conditions; Examination of Site; Owner's Safety Program; Other Work at the Site | 2 |
| Article 6— Bidder's Representations and Certifications..... | 5 |
| Article 7— Interpretations and Addenda | 5 |
| Article 8— Bid Security | 5 |
| Article 9— Contract Times | 6 |
| Article 10— Substitute and "Or Equal" Items..... | 6 |
| Article 11— Subcontractors, Suppliers, and Others | 6 |
| Article 12— Preparation of Bid..... | 7 |
| Article 13— Basis of Bid | 8 |
| Article 14— Submittal of Bid..... | 8 |
| Article 15— Modification and Withdrawal of Bid..... | 9 |
| Article 16— Opening of Bids..... | 9 |
| Article 17— Bids to Remain Subject to Acceptance | 9 |
| Article 18— Evaluation of Bids and Award of Contract | 9 |
| Article 19— Bonds and Insurance..... | 10 |
| Article 20— Signing of Agreement..... | 10 |
| Article 21— Sales and Use Taxes | 11 |
| Article 22— Contracts to Be Assigned | 11 |

ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.04 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.
1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.
- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.04.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information

that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
 - B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
 - C. Bidder's state or other contractor license number, if applicable.
 - D. Subcontractor and Supplier qualification information.
 - E. Other required information regarding qualifications.
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

- 4.01 A mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.
- 4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 Site and Other Areas

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions – N/A

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
 - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. *Geotechnical Baseline Report/Geotechnical Data Report:* The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
 - a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (“Baseline Conditions”). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
 - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

- A. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

- A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.
- B. Bidders visiting the Site are required to arrange their own transportation to the Site.
- C. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: **Mark Hamel, Town Engineer, Town of Dracut, 62 Arlington St, Dracut MA 01826, 978-454-2594, mhamel@dracutma.gov**. Bidder must conduct the required Site visit during normal working hours.
- D. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- E. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.
- F. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- G. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for

such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:
 - A. **William Davidson, PE, via email at wdavidson@hoyletanner.com no later than May 10, 2022 at 12:00pm.**
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **five (5)** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's

damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND “OR EQUAL” ITEMS

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for all portions of the Work within five days after Bid opening.
- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by

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the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

- 11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
 - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder's name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Unit Price*

- A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

13.02 *Allowances*

- A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 14—SUBMITTAL OF BID

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the

notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

- 14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16—OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 ***Award will be contingent upon Town meeting approval. Town meeting will be held in June 2022.***
- 18.02 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.03 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.04 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of

the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

- 18.05 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.
- 18.06 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
 - B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. Evaluation and award will be based on the base bid. Alternates will be evaluated by the owner and may or may not be selected to move forward. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.
 - C. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
- 18.07 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 18.08 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

- 19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

- 20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful

Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 Not Used.

ARTICLE 22—CONTRACTS TO BE ASSIGNED

22.01 Not Used.

BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to: **Town of Dracut, 62 Arlington St, Dracut MA 01826, Attn: Barbara O'Connor, Purchasing Agent**
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:
 - A. Required Bid security;
 - B. List of Proposed Subcontractors;
 - C. List of Proposed Suppliers;
 - D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
 - E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
 - F. Required Bidder Qualification Statement with supporting data

ARTICLE 3—BASIS OF BID—UNIT PRICES

- 3.01 *Unit Price Bids*
 - A. Bidder will perform the following BASE BID Work at the indicated unit prices: Reconstruction of road and parking lots near the entrance of the school complex along with drainage improvements, landscaping, and sidewalk construction. Includes full depth reclaim, micromilling & pavement overlay, and construction of new pavement areas. The base bid includes the addition of a new parking area near the entrance of Englesby Elementary School and reconfiguring the current parking lot on the side of Englesby to be two (2) separate parking areas. This also includes the repaving of parking areas to the north of Dracut Senior High and the parking areas to the front and back of Richardson Junior High.

| BASE BID | | | | | |
|----------|--|------|--------------------|----------------|------------|
| Item No. | Description | Unit | Estimated Quantity | Bid Unit Price | Bid Amount |
| 1 | MOBILIZATION, BONDS, INSURANCE | LS | 1 | \$ | \$ |
| 2 | TREES & SHRUBS, MISC. LANDSCAPING | LS | 1 | \$ | \$ |
| 3 | EXISTING TREE MITIGATION | LS | 1 | \$ | \$ |
| 4 | LANDSCAPE RESTORATION | LS | 1 | \$ | \$ |
| 5 | LOAM & SEED | SY | 675 | \$ | \$ |
| 6 | MAINTENANCE OF TRAFFIC & PEDESTRIANS | LS | 1 | \$ | \$ |
| 7 | FLAGGERS | HR | 100 | \$ | \$ |
| 8 | STABILIZED CONSTRUCTION ENTRANCE | LS | 1 | \$ | \$ |
| 9 | EROSION CONTROL & SWPPP W/ MONITORING | LS | 1 | \$ | \$ |
| 10 | SAWCUT PAVEMENT | LF | 2380 | \$ | \$ |
| 11 | REMOVE & DISPOSE OF CURBING | LF | 1425 | \$ | \$ |
| 12 | ROCK EXCAVATION | CY | 50 | \$ | \$ |
| 13 | COMMON EXCAVATION | CY | 1190 | \$ | \$ |
| 14 | EXPLORATORY EXCAVATION / TEST PIT | EA | 4 | \$ | \$ |
| 15 | EXISTING PIPE REMOVAL (ALL SIZE & TYPE, INCL. HAZARDOUS) | LF | 225 | \$ | \$ |
| 16 | REMOVE & DISPOSE OF EXISTING DRAINAGE STRUCTURES | EA | 6 | \$ | \$ |
| 17 | NEW SIGNS | EA | 37 | \$ | \$ |
| 18 | RELOCATE SIGNS | LS | 1 | \$ | \$ |
| 19 | NEW LIGHT POLE | EA | 2 | \$ | \$ |
| 20 | RELOCATE LIGHT POLES | EA | 3 | \$ | \$ |
| 21 | RELOCATE FIRE HYDRANTS | EA | 2 | \$ | \$ |
| 22 | DENSE-GRADED CRUSHED STONE (M2.01.7) | CY | 1240 | \$ | \$ |
| 23 | GRAVEL BORROW (MASSDOT M1.03.0 TYPE "B") | CY | 685 | \$ | \$ |
| 24 | SUPERPAVE SURFACE COURSE (12.5) | TON | 2920 | \$ | \$ |
| 25 | SUPERPAVE INTERMEDIATE COURSE (19.0) | TON | 1330 | \$ | \$ |
| 26 | 12" FULL DEPTH RECLAMATION | SY | 8165 | \$ | \$ |
| 27 | 1.5" PAVEMENT MICROMILLING | SY | 18660 | \$ | \$ |
| 28 | FINE GRADING | SY | 10100 | \$ | \$ |
| 29 | SPEED TABLE | EA | 1 | \$ | \$ |
| 30 | STRAIGHT VERTICAL GRANITE CURB | LF | 4030 | \$ | \$ |
| 31 | CURVED VERTICAL GRANITE CURB | LF | 2045 | \$ | \$ |
| 32 | 4" CONCRETE SIDEWALK | SY | 1875 | \$ | \$ |
| 33 | TRUNCATED DOME WARNING PANEL | EA | 25 | \$ | \$ |
| 34 | 4" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE | LF | 8540 | \$ | \$ |
| 35 | 12" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE | LF | 1200 | \$ | \$ |
| 36 | WHITE TRAFFIC ARROWS AND SYMBOLS - RETROREFLECTIVE | EA | 41 | \$ | \$ |
| 37 | 12" HDPE DRAINAGE PIPE | LF | 1020 | \$ | \$ |
| 38 | 15" HDPE DRAINAGE PIPE | LF | 40 | \$ | \$ |
| 39 | DRAIN MANHOLE | EA | 2 | \$ | \$ |
| 40 | CATCH BASIN | EA | 18 | \$ | \$ |
| 41 | FRAME & GRATE | EA | 3 | \$ | \$ |
| 42 | ADJUST STRUCTURES | EA | 2 | \$ | \$ |
| 43 | DRAINAGE STRUCTURE CHANGE IN TYPE | EA | 3 | \$ | \$ |

EJCDC® C-410, Bid Form for Construction Contract.

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| | | | | | |
|-----------------------------------|---|----|-----|--|----|
| 44 | HYDRODYNAMIC SEPARATOR | EA | 2 | | \$ |
| 45 | 48" CHAINLINK FENCE | LF | 380 | | |
| 46 | POURED-IN-PLACE RUBBERIZED PLAYGROUND SURFACE | SY | 435 | | |
| Total of All Unit Price Bid Items | | | | | \$ |

B. Bidder will perform the following Add Alt #1 Work at the indicated unit prices: Add Alt 1 Brookside Improvements – Reconstruction of road and parking lots around Brookside Elementary School along with drainage improvements, sidewalk construction, and landscaping. Includes full depth reclaim and the construction of new pavement areas. Existing paved areas to the rear of Brookside elementary will experience full depth reclamation. This add alt includes the construction of a new paved parking area located where there is an existing gravel lot next to the Football field.

| BID ADD ALT #1 - BROOKSIDE IMPROVEMENTS | | | | | |
|---|--|------|--------------------|----------------|------------|
| Item No. | Description | Unit | Estimated Quantity | Bid Unit Price | Bid Amount |
| 1 | MOBILIZATION, BONDS, INSURANCE | LS | 1 | | \$ |
| 2 | TREES & SHRUBS, MISC. LANDSCAPING | LS | 1 | | \$ |
| 3 | EXISTING TREE MITIGATION | LS | 1 | | \$ |
| 4 | LANDSCAPE RESTORATION | LS | 1 | | \$ |
| 5 | LOAM & SEED | SY | 1530 | | \$ |
| 6 | MAINTENANCE OF TRAFFIC & PEDESTRIANS | LS | 1 | | \$ |
| 7 | EROSION CONTROL & SWPPP W/ MONITORING | LS | 1 | | \$ |
| 8 | SAWCUT PAVEMENT | LF | 150 | | \$ |
| 9 | REMOVE & DISPOSE OF CURBING | LF | 160 | | \$ |
| 10 | COMMON EXCAVATION | CY | 730 | | \$ |
| 11 | NEW SIGNS | EA | 4 | | \$ |
| 12 | RELOCATE SIGNS | LS | 1 | | \$ |
| 13 | NEW LIGHT POLES | EA | 2 | | \$ |
| 14 | RELOCATE LIGHT POLES | EA | 1 | | \$ |
| 15 | DENSE-GRADED CRUSHED STONE (M2.01.7) | CY | 850 | | \$ |
| 16 | GRAVEL BORROW (MASSDOT M1.03.0 TYPE "B") | CY | 470 | | \$ |
| 17 | SUPERPAVE SURFACE COURSE (12.5) | TON | 1230 | | \$ |
| 18 | SUPERPAVE INTERMEDIATE COURSE (19.0) | TON | 1230 | | \$ |
| 19 | FINE GRADING | SY | 10840 | | \$ |
| 20 | 12" FULL DEPTH RECLAMATION | SY | 8735 | | \$ |
| 21 | STRAIGHT VERTICAL GRANITE CURB | LF | 515 | | \$ |
| 22 | CURVED VERTICAL GRANITE CURB | LF | 145 | | \$ |
| 23 | BITUMINOUS SIDEWALK | SY | 360 | | \$ |
| 24 | 4" CONCRETE SIDEWALK | SY | 615 | | \$ |
| 25 | TRUNCATED DOME WARNING PANEL | EA | 8 | | \$ |
| 26 | 4" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE | LF | 4850 | | \$ |
| 27 | 12" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE | LF | 80 | | \$ |
| 28 | WHITE TRAFFIC ARROWS AND SYMBOLS - RETROREFLECTIVE | EA | 4 | | \$ |
| 29 | 12" HDPE DRAINAGE PIPE | LF | 410 | | \$ |
| 30 | CATCH BASIN | EA | 3 | | \$ |

| | | | | | |
|-----------------------------------|-----------------------|----|---|--|----|
| 31 | FRAME & GRATE | EA | 4 | | \$ |
| 32 | ADJUST STRUCTURES | EA | 3 | | \$ |
| 33 | CONCRETE DUMPSTER PAD | EA | 1 | | \$ |
| Total of All Unit Price Bid Items | | | | | \$ |

- C. Bidder will perform the following Add Alt #2 Work at the indicated unit prices: Add Alt 2 Mill & Overlay - Micromilling and pavement overlay of roads. This would include the road that runs behind Richardson Junior High, the road that runs alongside the baseball fields going to Brookside Elementary, and the road that runs north to the rear lot of Richardson Junior High.

| BID ADD ALT #2 - MILL & OVERLAY | | | | | |
|-----------------------------------|---|------|--------------------|----------------|------------|
| Item No. | Description | Unit | Estimated Quantity | Bid Unit Price | Bid Amount |
| 1 | MOBILIZATION, BONDS, INSURANCE | LS | 1 | | \$ |
| 2 | MAINTENANCE OF TRAFFIC & PEDESTRIANS | LS | 1 | | \$ |
| 3 | EROSION CONTROL & SWPPP W/ MONITORING | LS | 1 | | \$ |
| 4 | NEW SIGNS | EA | 1 | | \$ |
| 5 | 1.5" PAVEMENT MICROMILLING | SY | 5700 | | \$ |
| 6 | 4" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE | LF | 3135 | | \$ |
| 7 | 12" WHITE PAVEMENT MARKINGS – RETROREFLECTIVE | LF | 165 | | \$ |
| 8 | SUPERPAVE SURFACE COURSE (12.5) | TON | 490 | | \$ |
| Total of All Unit Price Bid Items | | | | | \$ |

- D. Bidder will perform the following Add Alt #3 Work at the indicated unit prices: Add Alt 3 Rubberized Playground Surface - Addition of a playground with a rubberized surface. This includes the creation of a rubberized playground surface along the edge of Englesby Elementary School. This playground would be an expansion of the existing playground area.

| BID ADD ALT #3 - RUBBERIZED PLAYGROUND SURFACE | | | | | |
|--|---|------|--------------------|----------------|------------|
| Item No. | Description | Unit | Estimated Quantity | Bid Unit Price | Bid Amount |
| 1 | MOBILIZATION, BONDS, INSURANCE | LS | 1 | | \$ |
| 2 | EROSION CONTROL & SWPPP W/ MONITORING | LS | 1 | | \$ |
| 3 | POURED-IN-PLACE RUBBERIZED PLAYGROUND SURFACE | SY | 1410 | | \$ |
| Total of All Unit Price Bid Items | | | | | \$ |

- E. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.02 Total Base Bid Price (Unit Prices)

| | |
|--|----|
| Total Base Bid Price (Total of all Unit Price Bid) | \$ |
| Written total amount is: | |

3.03 *Total Bid Add Alt #1 – Brookside Improvements Price (Unit Prices)*

| | |
|--|----|
| Total Bid Add Alt #1 – Brookside Improvements Price (Total of all Unit Price Bid) | \$ |
| Written total amount is: | |

3.04 *Total Bid Add Alt #2 – Mill & Overlay Price (Unit Prices)*

| | |
|---|----|
| Total Bid Add Alt #2 – Mill & Overlay Price (Total of all Unit Price Bid) | \$ |
| Written total amount is: | |

3.05 *Total Bid Add Alt #3 – Rubberized Playground Surface Price (Unit Prices)*

| | |
|--|----|
| Total Bid Add Alt #3 – Rubberized Playground Surface Price (Total of all Unit Price Bid) | \$ |
| Written total amount is: | |

3.06 *Total of Base Bid, Add Alt #1, Add Alt #2, and Add Alt #3 (Unit Prices)*

| | |
|---|----|
| Total Bid Price of Base Bid and all ADD Alts (Total of all Unit Price Bids) | \$ |
| Written total amount is: | |

ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

| Addendum Number | Addendum Date |
|-----------------|---------------|
| | |
| | |
| | |

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
 8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
 9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
 11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 Bidder's Certifications

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
 - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable) _____

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable) _____

BID BOND (PENAL SUM FORM)

| | |
|--|---|
| Bidder Name: Address (<i>principal place of business</i>): | Surety Name: Address (<i>principal place of business</i>): |
| Owner Name: Town of Dracut Address (<i>principal place of business</i>): 62 Arlington St Dracut, MA 01826 | Bid Project (<i>name and location</i>): Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools, Dracut, MA 01826 Bid Due Date: May 20, 2022, 11:00AM EST |
| Bond Penal Sum: Date of Bond: | Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative. |
| Bidder <hr/> By: _____ Name: _____ Title: _____ Attest: _____ Name: _____ Title: _____ | Surety <hr/> By: _____ Name: _____ Title: _____ Attest: _____ Name: _____ Title: _____ |
| <i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i> | |

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

BID BOND (DAMAGES FORM)

| | |
|--|--|
| <p>Bidder</p> <p>Name:</p> <p>Address (<i>principal place of business</i>):</p> | <p>Surety</p> <p>Name:</p> <p>Address (<i>principal place of business</i>):</p> |
| <p>Owner</p> <p>Name: Town of Dracut</p> <p>Address (<i>principal place of business</i>):</p> <p>62 Arlington St Dracut, MA 01826</p> | <p>Bid</p> <p>Project (<i>name and location</i>):</p> <p>Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools, Dracut, MA 01826</p> <p>Bid Due Date: May 20, 2022, 11:00AM EST</p> |
| <p>Bond</p> <p>Bond Amount:</p> <p>Date of Bond:</p> <p>Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.</p> | |
| <p>Bidder</p> <hr/> <p>(<i>Full formal name of Bidder</i>)</p> <p>By: _____ (<i>Signature</i>)</p> <p>Name: _____ (<i>Printed or typed</i>)</p> <p>Title: _____</p> <p>Attest: _____ (<i>Signature</i>)</p> <p>Name: _____ (<i>Printed or typed</i>)</p> <p>Title: _____</p> | <p>Surety</p> <hr/> <p>(<i>Full formal name of Surety</i>) (<i>corporate seal</i>)</p> <p>By: _____ (<i>Signature</i>) (<i>Attach Power of Attorney</i>)</p> <p>Name: _____ (<i>Printed or typed</i>)</p> <p>Title: _____</p> <p>Attest: _____ (<i>Signature</i>)</p> <p>Name: _____ (<i>Printed or typed</i>)</p> <p>Title: _____</p> |
| <p>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</p> | |

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid, as determined by Owner, for the work required by the Contract Documents, provided that:
 - 1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the bond amount set forth on the face of this Bond, and
 - 1.2. In no event will Bidder's and Surety's obligation hereunder exceed the bond amount set forth on the face of this Bond.
 - 1.3. Recovery under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions will not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond must be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

- 1.01 Provide contact information for the Business:

| | | | |
|---------------------------------------|--|----------------|--|
| Legal Name of Business: | | | |
| Corporate Office | | | |
| Name: | | Phone number: | |
| Title: | | Email address: | |
| Business address of corporate office: | | | |
| | | | |
| | | | |
| Local Office | | | |
| Name: | | Phone number: | |
| Title: | | Email address: | |
| Business address of local office: | | | |
| | | | |
| | | | |

- 1.02 Provide information on the Business's organizational structure:

| | | | |
|---|--|---|--|
| Form of Business: | <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation | | |
| <input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies: | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| Provide a separate Qualification Statement for each Joint Venturer. | | | |
| Date Business was formed: | | State in which Business was formed: | |
| Is this Business authorized to operate in the Project location? | | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending | |

- 1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

| | | | |
|-------------------|--|--------------|--|
| Name of business: | | Affiliation: | |
| Address: | | | |
| Name of business: | | Affiliation: | |
| Address: | | | |
| Name of business: | | Affiliation: | |
| Address: | | | |

- 1.04 Provide information regarding the Business's officers, partners, and limits of authority.

| | | | |
|--|--|------------------------|--|
| Name: | | Title: | |
| Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No | | Limit of Authority: \$ | |
| Name: | | Title: | |
| Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No | | Limit of Authority: \$ | |
| Name: | | Title: | |
| Authorized to sign contracts: <input type="checkbox"/> Yes <input type="checkbox"/> No | | Limit of Authority: \$ | |
| Name: | | Title: | |

ARTICLE 2—LICENSING

- 2.01 Provide information regarding licensure for Business:

| | | | |
|-------------------|--|------------------|--|
| Name of License: | | | |
| Licensing Agency: | | | |
| License No: | | Expiration Date: | |
| Name of License: | | | |
| Licensing Agency: | | | |
| License No: | | Expiration Date: | |

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

- 3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

| Certification | Certifying Agency | Certification Date |
|---|-------------------|--------------------|
| <input type="checkbox"/> Disadvantaged Business Enterprise | | |
| <input type="checkbox"/> Minority Business Enterprise | | |
| <input type="checkbox"/> Woman-Owned Business Enterprise | | |
| <input type="checkbox"/> Small Business Enterprise | | |
| <input type="checkbox"/> Disabled Business Enterprise | | |
| <input type="checkbox"/> Veteran-Owned Business Enterprise | | |
| <input type="checkbox"/> Service-Disabled Veteran-Owned Business | | |
| <input type="checkbox"/> HUBZone Business (Historically Underutilized) Business | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> None | | |

ARTICLE 4—SAFETY

- 4.01 Provide information regarding Business's safety organization and safety performance.

| Name of Business's Safety Officer: | | |
|------------------------------------|----------------|------------|
| Safety Certifications | | |
| Certification Name | Issuing Agency | Expiration |
| | | |
| | | |

- 4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

| Year | | | | | | | | | |
|---------|-----|------|----|-----|------|----|-----|------|----|
| Company | EMR | TRFR | MH | EMR | TRFR | MH | EMR | TRFR | MH |
| | | | | | | | | | |
| | | | | | | | | | |

ARTICLE 5—FINANCIAL

- 5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

| | | | |
|---|--|-----------------------------------|--|
| Financial Institution: | | | |
| Business address: | | | |
| Date of Business's most recent financial statement: | | <input type="checkbox"/> Attached | |
| Date of Business's most recent audited financial statement: | | <input type="checkbox"/> Attached | |
| Financial indicators from the most recent financial statement | | | |
| Contractor's Current Ratio (Current Assets ÷ Current Liabilities) | | | |
| Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities) | | | |

ARTICLE 6—SURETY INFORMATION

- 6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

| | | | |
|--|--|--|--|
| Surety Name: | | | |
| Surety is a corporation organized and existing under the laws of the state of: | | | |
| Is surety authorized to provide surety bonds in the Project location? | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? | | | |
| <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Mailing Address (principal place of business): | | | |
| | | | |
| | | | |
| Physical Address (principal place of business): | | | |
| | | | |
| | | | |
| Phone (main): | | Phone (claims): | |

ARTICLE 7—INSURANCE

- 7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

| | | |
|--|------------------------------------|-----------------|
| Name of insurance provider, and type of policy (CLE, auto, etc.): | | |
| Insurance Provider | Type of Policy (Coverage Provided) | |
| | | |
| | | |
| | | |
| | | |
| Are providers licensed or authorized to issue policies in the Project location? <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Does provider have an A.M. Best Rating of A-VII or better? <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Mailing Address (principal place of business): | | |
| | | |
| | | |
| Physical Address (principal place of business): | | |
| | | |
| | | |
| Phone (main): | | Phone (claims): |

ARTICLE 8—CONSTRUCTION EXPERIENCE

- 8.01 Provide information that will identify the overall size and capacity of the Business.

| | |
|--|--|
| Average number of current full-time employees: | |
| Estimate of revenue for the current year: | |
| Estimate of revenue for the previous year: | |

- 8.02 Provide information regarding the Business's previous contracting experience.

| | |
|---|----------------------|
| Years of experience with projects like the proposed project: | |
| As a general contractor: | As a joint venturer: |
| Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03: | |
| Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Provide full details in a separate attachment if the response to any of these questions is Yes. | |

- 8.03 List all projects currently under contract in Schedule A and provide indicated information.
- 8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.
- 8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

- 9.01 Provide the following information with the Statement of Qualifications:
- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
 - B. Diverse Business Certifications if required by Paragraph 3.01.
 - C. Certification of Business's safety performance if required by Paragraph 4.02.
 - D. Financial statements as required by Paragraph 5.01.

- E. Attachments providing additional information as required by Paragraph 8.02.
- F. Schedule A (Current Projects) as required by Paragraph 8.03.
- G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
- H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
- I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business: _____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Address:

Phone: _____

Email: _____

Schedule A—Current Projects

| | | | | | |
|---|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |

Schedule B—Previous Experience with Similar Projects

| | | | | | |
|---|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |

Schedule B—Previous Experience with Similar Projects

| | | | | | |
|---|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |
| Project Owner | | | Project Name | | |
| General Description of Project | | | | | |
| Project Cost | | | Date Project | | |
| Key Project Personnel | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager | |
| Name | | | | | |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) | | | | | |
| | Name | Title/Position | Organization | Telephone | Email |
| Owner | | | | | |
| Designer | | | | | |
| Construction Manager | | | | | |

Schedule C—Key Individuals

| Project Manager | | |
|--|---------------------------------------|-----------------------------------|
| Name of individual | | |
| Years of experience as project manager | | |
| Years of experience with this organization | | |
| Number of similar projects as project manager | | |
| Number of similar projects in other positions | | |
| Current Project Assignments | | |
| Name of assignment | Percent of time used for this project | Estimated project completion date |
| | | |
| | | |
| | | |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) | | |
| Name | Name | |
| Title/Position | Title/Position | |
| Organization | Organization | |
| Telephone | Telephone | |
| Email | Email | |
| Project | Project | |
| Candidate's role on project | Candidate's role on project | |
| Project Superintendent | | |
| Name of individual | | |
| Years of experience as project superintendent | | |
| Years of experience with this organization | | |
| Number of similar projects as project superintendent | | |
| Number of similar projects in other positions | | |
| Current Project Assignments | | |
| Name of assignment | Percent of time used for this project | Estimated project completion date |
| | | |
| | | |
| | | |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) | | |
| Name | Name | |
| Title/Position | Title/Position | |
| Organization | Organization | |
| Telephone | Telephone | |
| Email | Email | |
| Project | Project | |
| Candidate's role on project | Candidate's role on project | |

| Safety Manager | | | |
|---|---------------------------------------|-----------------------------------|--|
| Name of individual | | | |
| Years of experience as project manager | | | |
| Years of experience with this organization | | | |
| Number of similar projects as project manager | | | |
| Number of similar projects in other positions | | | |
| Current Project Assignments | | | |
| Name of assignment | Percent of time used for this project | Estimated project completion date | |
| | | | |
| | | | |
| | | | |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) | | | |
| Name | Name | | |
| Title/Position | Title/Position | | |
| Organization | Organization | | |
| Telephone | Telephone | | |
| Email | Email | | |
| Project | Project | | |
| Candidate's role on project | Candidate's role on project | | |
| Quality Control Manager | | | |
| Name of individual | | | |
| Years of experience as project superintendent | | | |
| Years of experience with this organization | | | |
| Number of similar projects as project superintendent | | | |
| Number of similar projects in other positions | | | |
| Current Project Assignments | | | |
| Name of assignment | Percent of time used for this project | Estimated project completion date | |
| | | | |
| | | | |
| | | | |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) | | | |
| Name | Name | | |
| Title/Position | Title/Position | | |
| Organization | Organization | | |
| Telephone | Telephone | | |
| Email | Email | | |
| Project | Project | | |
| Candidate's role on project | Candidate's role on project | | |

NOTICE OF AWARD

Date of Issuance:

Owner: Town of Dracut Owner's Project No.:
Engineer: Hoyle, Tanner & Associates, Inc. Engineer's Project No.: 21.926301.00
Project: Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools
Contract Name: Pedestrian Safety & Traffic Circulation Improvements Project
Bidder:
Bidder's Address:

You are notified that Owner has accepted your Bid dated _____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools

The Contract Price of the awarded Contract is \$_____. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

Four unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **four (4)** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **Town of Dracut, Massachusetts**

By (*signature*): _____

Name (*printed*): _____

Title: _____

Copy: Engineer

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **the Town of Dracut** ("Owner") and _____ ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Construction of the reconfiguration of the existing parking areas driveways, access points, crosswalks, bus/parent drop off locations, landscaping, new greenspace, recess areas, playground upgrades and repaving.**

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **Pedestrian Safety & Traffic Circulation Improvements Project**

ARTICLE 3—ENGINEER

3.01 The Owner has retained _____ ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by **Hoyle, Tanner & Associates, Inc. (Hoyle Tanner).**

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

A. The Work is anticipated to start on **June 28th, 2022** and will be substantially complete on or before **August 25, 2022**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **September 1, 2022** for the base bid. Additional time will be allowed for alternates.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration

proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner \$1,000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
 2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$1,000 for each day that expires after such time until the Work is completed and ready for final payment.
 3. Liquidated damages for failing to timely attain Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

4.06 Special Damages

- A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.
- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.
- C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

- A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the **15th** day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. _____ percent of the value of the Work completed (with the balance being retainage).

- 1) If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

b. _____ percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **100** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less twenty percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 Final Payment

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 Consent of Surety

- A. Owner will not make final payment, or return or release retainage, at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

CONTRACT DOCUMENTS

7.01 Contents

- A. The Contract Documents consist of all of the following:

1. This Agreement.
 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 3. Qualifications
 4. General Conditions.
 5. Supplementary Conditions.
 6. Specifications as listed in the table of contents of the project manual (copy of list attached).
 7. Drawings (not attached but incorporated by reference) consisting of 16 sheets with each sheet bearing the following general title: **Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools**
 8. Addenda (numbers _____ to _____, inclusive).
 9. Exhibits to this Agreement (enumerated as follows):
 - a. none
 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 7—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 Contractor's Representations

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

Owner:

(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

(If [Type of Entity] is a corporation, attach evidence of authority to sign. If [Type of Entity] is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Contractor:

(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

License No.: _____
(where applicable)

State: _____

NOTICE TO PROCEED

Owner: Town of Dracut Owner's Project No.: _____
Engineer: Hoyle, Tanner & Associates, Inc. Engineer's Project No.: 21.926301.00
Contractor: _____ Contractor's Project No.: _____
Project: Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools
Contract Name: Pedestrian Safety & Traffic Circulation Improvements Project

Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____ pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

The date by which construction is anticipated to start is **June 28, 2022** and Substantial Completion must be achieved is **August 25, 2022**, and the date by which readiness for final payment must be achieved is **September 1, 2022**, for the base bid. Additional time will be allowed for the alternates.

Before starting any Work at the Site, Contractor must comply with the following:

Owner: **Town of Dracut, Massachusetts**
By (*signature*): _____
Name (*printed*): _____
Title: _____
Date Issued: _____
Copy: Engineer

PERFORMANCE BOND

| | |
|--|--|
| Contractor Name: Address (<i>principal place of business</i>): | Surety Name: Address (<i>principal place of business</i>): |
| Owner Name: Town of Dracut Mailing address (<i>principal place of business</i>): 62 Arlington St Dracut, MA 01826 | Contract Description (<i>name and location</i>): Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools, Dracut, MA 01826 Contract Price: Effective Date of Contract: |
| Bond Bond Amount: Date of Bond: <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16 | |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative. | |
| Contractor as Principal <i>(Full formal name of Contractor)</i> By: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ | Surety <i>(Full formal name of Surety) (corporate seal)</i> By: _____ <i>(Signature)(Attach Power of Attorney)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i> | |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **None**

WARRANTY BOND

| | |
|--|---|
| Contractor Name: Address (<i>principal place of business</i>): | Surety Name: Address (<i>principal place of business</i>): |
| Owner Name: Town of Dracut Address (<i>principal place of business</i>): 62 Arlington St Dracut, MA 01826 | Construction Contract Description (<i>name and location</i>): Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools, Dracut, MA 01826 Contract Price: Effective Date of Contract: Contract's Date of Substantial Completion: |
| Bond Bond Amount: _____ Date of Bond: _____ | Bond Period: Commencing 364 days after Substantial Completion of the Work under the Construction Contract, and continuing until 3 years after such Substantial Completion. |
| Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 9 | |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative. | |
| Contractor as Principal <hr/> <i>(Full formal name of Contractor)</i> By: _____ (Signature) | Surety <hr/> <i>(Full formal name of Surety) (corporate seal)</i> By: _____ (Signature) (Attach Power of Attorney) |
| Name: _____ (Printed or typed) | Name: _____ (Printed or typed) |
| Title: _____ | Title: _____ |
| Attest: _____ (Signature) | Attest: _____ (Signature) |
| Name: _____ (Printed or typed) | Name: _____ (Printed or typed) |
| Title: _____ | Title: _____ |

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract's Correction Period Obligations. The Construction Contract is incorporated herein by reference.
2. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
3. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
4. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
5. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
6. Any proceeding, legal or equitable, under this Warranty Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
7. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
8. Definitions
 - 8.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 8.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
 - 8.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.
 - 8.4. *Substantial Completion*—As defined in the Construction Contract.
 - 8.5. *Work*—As defined in the Construction Contract.
9. Modifications to this Bond are as follows: **None**

PAYMENT BOND

| | |
|--|--|
| Contractor Name: Address (<i>principal place of business</i>): | Surety Name: Address (<i>principal place of business</i>): |
| Owner Name: Town of Dracut Mailing address (<i>principal place of business</i>): 62 Arlington St Dracut, MA 01826 | Contract Description (<i>name and location</i>): Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools, Dracut, MA 01826 Contract Price: Effective Date of Contract: |
| Bond Bond Amount: Date of Bond: (<i>Date of Bond cannot be earlier than Effective Date of Contract</i>) Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18 | |
| Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative. | |
| Contractor as Principal | Surety |
| <i>(Full formal name of Contractor)</i> | |
| By: _____ <i>(Signature)</i> | By: _____ <i>(Signature)(Attach Power of Attorney)</i> |
| Name: _____ <i>(Printed or typed)</i> | Name: _____ <i>(Printed or typed)</i> |
| Title: _____ | Title: _____ |
| Attest: _____ <i>(Signature)</i> | Attest: _____ <i>(Signature)</i> |
| Name: _____ <i>(Printed or typed)</i> | Name: _____ <i>(Printed or typed)</i> |
| Title: _____ | Title: _____ |
| <i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i> | |

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

- 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: **None**

Contractor's Application for Payment

| | |
|--|---------------------------|
| Owner: | Owner's Project No.: |
| Engineer: | Engineer's Project No.: |
| Contractor: | Contractor's Project No.: |
| Project: | |
| Contract: | |
| Application No.: | Application Date: |
| Application Period: From _____ | to _____ |
| 1. Original Contract Price \$ - | |
| 2. Net change by Change Orders \$ - | |
| 3. Current Contract Price (Line 1 + Line 2) \$ - | |
| 4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total) \$ - | |
| 5. Retainage | |
| a. _____ X \$ - | Work Completed \$ - |
| b. _____ X \$ - | Stored Materials \$ - |
| c. Total Retainage (Line 5.a + Line 5.b) \$ - | |
| 6. Amount eligible to date (Line 4 - Line 5.c) \$ - | |
| 7. Less previous payments (Line 6 from prior application) \$ - | |
| 8. Amount due this application \$ - | |
| 9. Balance to finish, including retainage (Line 3 - Line 4) \$ - | |
| Contractor's Certification | |
| The undersigned Contractor certifies, to the best of its knowledge, the following: | |
| (1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment; | |
| (2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and | |
| (3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective. | |
| Contractor: | |
| Signature: | Date: |
| Recommended by Engineer | Approved by Owner |
| By: | By: |
| Title: | Title: |
| Date: | Date: |
| Approved by Funding Agency | |
| By: | By: |
| Title: | Title: |
| Date: | Date: |

Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: _____
 Engineer: _____
 Contractor: _____
 Project: _____
 Contract: _____

Owner's Project No.: _____
 Engineer's Project No.: _____
 Contractor's Project No.: _____

| Application No.: _____ | | Application Period: From _____ to _____ | | Application Date: _____ | | | | | | | |
|--------------------------|-------------|---|-------|-------------------------|--------------------------------|---|--|--|--|--------------------------------|--------------------------------|
| A | B | C | D | E | F | G | H | I | J | K | L |
| Bid Item No. | Description | Contract Information | | | | Work Completed | | Materials Currently Stored (not in G) (\$) | Work Completed and Materials Stored to Date (H + I) (\$) | % of Value of Item (J / F) (%) | Balance to Finish (F - J) (\$) |
| | | Item Quantity | Units | Unit Price (\$) | Value of Bid Item (C X E) (\$) | Estimated Quantity Incorporated in the Work | Value of Work Completed to Date (E X G) (\$) | | | | |
| Original Contract | | | | | | | | | | | |
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| | | | | | | | | | | | |
| Original Contract Totals | | \$ | - | \$ | - | \$ | - | \$ | - | \$ | - |
| | | | | | | | | | | | |

Progress Estimate - Unit Price Work

Contractor's Application for Payment

| | |
|-------------|--|
| Owner: | |
| Engineer: | |
| Contractor: | |
| Project: | |
| Contract: | |

Owner's Project No.: _____
Engineer's Project No.: _____
Contractor's Project No.: _____

Application No.: _____ **Application Period:** _____ **From** _____ **to** _____ **Application Date:** _____

Stored Materials Summary

Contractor's Application for Payment

| | |
|-------------|----------------------|
| Owner: | <input type="text"/> |
| Engineer: | <input type="text"/> |
| Contractor: | <input type="text"/> |
| Project: | <input type="text"/> |
| Contract: | <input type="text"/> |

Owner's Project No.: _____
Engineer's Project No.: _____
Contractor's Project No.: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

| | | |
|----------------|---|--------------------------------------|
| Owner: | Town of Dracut | Owner's Project No.: |
| Engineer: | Hoyle, Tanner & Associates, Inc. | Engineer's Project No.: 21.926301.00 |
| Contractor: | Contractor's Project No.: | |
| Project: | Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools | |
| Contract Name: | Pedestrian Safety & Traffic Circulation Improvements Project | |

This Preliminary Final Certificate of Substantial Completion applies to:

All Work The following specified portions of the Work:

Date of Substantial Completion:

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: None As follows:

Amendments to Contractor's Responsibilities: None As follows:

The following documents are attached to and made a part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By (signature): _____

Name (printed): _____

Title: _____

NOTICE OF ACCEPTABILITY OF WORK

Owner: Town of Dracut Owner's Project No.:
Engineer: Hoyle, Tanner & Associates, Inc. Engineer's Project No.: 21.926301.00
Contractor: Contractor's Project No.:
Project: Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools
Contract Name: Pedestrian Safety & Traffic Circulation Improvements Project
Notice Date: Effective Date of the Construction Contract:

The Engineer hereby gives notice to the Owner and Contractor that Engineer recommends final payment to Contractor, and that the Work furnished and performed by Contractor under the Construction Contract is acceptable, expressly subject to the provisions of the Construction Contract's Contract Documents ("Contract Documents") and of the Agreement between Owner and Engineer for Professional Services dated _____ ("Owner-Engineer Agreement"). This Notice of Acceptability of Work (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

1. This Notice has been prepared with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. This Notice reflects and is an expression of the Engineer's professional opinion.
3. This Notice has been prepared to the best of Engineer's knowledge, information, and belief as of the Notice Date.
4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's Work) under the Owner-Engineer Agreement, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Owner-Engineer Agreement.
5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents, or to otherwise comply with the Contract Documents or the terms of any special guarantees specified therein.
6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

Engineer

By (*signature*): _____

Name (*printed*): _____

Title: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

| | Page |
|--|-------------|
| Article 1—Definitions and Terminology..... | 1 |
| 1.01 Defined Terms..... | 1 |
| 1.02 Terminology | 6 |
| Article 2—Preliminary Matters | 7 |
| 2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance..... | 7 |
| 2.02 Copies of Documents | 7 |
| 2.03 Before Starting Construction | 7 |
| 2.04 Preconstruction Conference; Designation of Authorized Representatives | 8 |
| 2.05 Acceptance of Schedules | 8 |
| 2.06 Electronic Transmittals | 8 |
| Article 3—Contract Documents: Intent, Requirements, Reuse | 9 |
| 3.01 Intent..... | 9 |
| 3.02 Reference Standards..... | 9 |
| 3.03 Reporting and Resolving Discrepancies | 10 |
| 3.04 Requirements of the Contract Documents..... | 10 |
| 3.05 Reuse of Documents | 11 |
| Article 4—Commencement and Progress of the Work | 11 |
| 4.01 Commencement of Contract Times; Notice to Proceed | 11 |
| 4.02 Starting the Work..... | 11 |
| 4.03 Reference Points | 11 |
| 4.04 Progress Schedule | 12 |
| 4.05 Delays in Contractor's Progress | 12 |
| Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions | 13 |
| 5.01 Availability of Lands | 13 |
| 5.02 Use of Site and Other Areas..... | 14 |
| 5.03 Subsurface and Physical Conditions..... | 15 |
| 5.04 Differing Subsurface or Physical Conditions | 16 |

| | | |
|------|--|-----------|
| 5.05 | Underground Facilities..... | 17 |
| 5.06 | Hazardous Environmental Conditions at Site | 19 |
| | Article 6—Bonds and Insurance..... | 21 |
| 6.01 | Performance, Payment, and Other Bonds | 21 |
| 6.02 | Insurance—General Provisions..... | 22 |
| 6.03 | Contractor’s Insurance..... | 24 |
| 6.04 | Builder’s Risk and Other Property Insurance | 25 |
| 6.05 | Property Losses; Subrogation | 25 |
| 6.06 | Receipt and Application of Property Insurance Proceeds | 27 |
| | Article 7—Contractor’s Responsibilities | 27 |
| 7.01 | Contractor’s Means and Methods of Construction | 27 |
| 7.02 | Supervision and Superintendence | 27 |
| 7.03 | Labor; Working Hours | 27 |
| 7.04 | Services, Materials, and Equipment | 28 |
| 7.05 | “Or Equals” | 28 |
| 7.06 | Substitutes | 29 |
| 7.07 | Concerning Subcontractors and Suppliers | 31 |
| 7.08 | Patent Fees and Royalties | 32 |
| 7.09 | Permits | 33 |
| 7.10 | Taxes | 33 |
| 7.11 | Laws and Regulations..... | 33 |
| 7.12 | Record Documents..... | 33 |
| 7.13 | Safety and Protection | 34 |
| 7.14 | Hazard Communication Programs | 35 |
| 7.15 | Emergencies | 36 |
| 7.16 | Submittals | 36 |
| 7.17 | Contractor’s General Warranty and Guarantee | 39 |
| 7.18 | Indemnification | 40 |
| 7.19 | Delegation of Professional Design Services | 40 |
| | Article 8—Other Work at the Site..... | 41 |
| 8.01 | Other Work | 41 |
| 8.02 | Coordination | 42 |
| 8.03 | Legal Relationships..... | 42 |

| | |
|---|----|
| Article 9—Owner’s Responsibilities | 43 |
| 9.01 Communications to Contractor | 43 |
| 9.02 Replacement of Engineer..... | 43 |
| 9.03 Furnish Data | 43 |
| 9.04 Pay When Due..... | 43 |
| 9.05 Lands and Easements; Reports, Tests, and Drawings..... | 43 |
| 9.06 Insurance..... | 44 |
| 9.07 Change Orders | 44 |
| 9.08 Inspections, Tests, and Approvals..... | 44 |
| 9.09 Limitations on Owner’s Responsibilities | 44 |
| 9.10 Undisclosed Hazardous Environmental Condition..... | 44 |
| 9.11 Evidence of Financial Arrangements..... | 44 |
| 9.12 Safety Programs | 44 |
| Article 10—Engineer’s Status During Construction | 44 |
| 10.01 Owner’s Representative..... | 44 |
| 10.02 Visits to Site..... | 44 |
| 10.03 Resident Project Representative..... | 45 |
| 10.04 Engineer’s Authority | 45 |
| 10.05 Determinations for Unit Price Work | 45 |
| 10.06 Decisions on Requirements of Contract Documents and Acceptability of Work | 45 |
| 10.07 Limitations on Engineer’s Authority and Responsibilities | 46 |
| 10.08 Compliance with Safety Program..... | 46 |
| Article 11—Changes to the Contract | 46 |
| 11.01 Amending and Supplementing the Contract | 46 |
| 11.02 Change Orders | 47 |
| 11.03 Work Change Directives..... | 47 |
| 11.04 Field Orders..... | 47 |
| 11.05 Owner-Authorized Changes in the Work | 48 |
| 11.06 Unauthorized Changes in the Work..... | 48 |
| 11.07 Change of Contract Price | 48 |
| 11.08 Change of Contract Times..... | 49 |
| 11.09 Change Proposals..... | 49 |
| 11.10 Notification to Surety..... | 51 |

| | |
|--|----|
| Article 12—Claims | 51 |
| 12.01 Claims..... | 51 |
| Article 13—Cost of the Work; Allowances; Unit Price Work | 52 |
| 13.01 Cost of the Work | 52 |
| 13.02 Allowances | 55 |
| 13.03 Unit Price Work..... | 56 |
| 13.04 Prevailing Wage Rates..... | 56 |
| Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work | 57 |
| 14.01 Access to Work..... | 57 |
| 14.02 Tests, Inspections, and Approvals..... | 57 |
| 14.03 Defective Work | 58 |
| 14.04 Acceptance of Defective Work..... | 59 |
| 14.05 Uncovering Work | 59 |
| 14.06 Owner May Stop the Work | 59 |
| 14.07 Owner May Correct Defective Work..... | 60 |
| Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period | 60 |
| 15.01 Progress Payments..... | 60 |
| 15.02 Contractor's Warranty of Title | 63 |
| 15.03 Substantial Completion..... | 63 |
| 15.04 Partial Use or Occupancy | 64 |
| 15.05 Final Inspection | 65 |
| 15.06 Final Payment..... | 65 |
| 15.07 Waiver of Claims | 66 |
| 15.08 Correction Period | 67 |
| Article 16—Suspension of Work and Termination | 68 |
| 16.01 Owner May Suspend Work | 68 |
| 16.02 Owner May Terminate for Cause..... | 68 |
| 16.03 Owner May Terminate for Convenience..... | 69 |
| 16.04 Contractor May Stop Work or Terminate | 69 |
| Article 17—Final Resolution of Disputes | 70 |
| 17.01 Methods and Procedures..... | 70 |
| Article 18—Miscellaneous | 70 |
| 18.01 Giving Notice | 70 |

| | | |
|-------|-------------------------------|----|
| 18.02 | Computation of Times..... | 70 |
| 18.03 | Cumulative Remedies | 71 |
| 18.04 | Limitation of Damages | 71 |
| 18.05 | No Waiver | 71 |
| 18.06 | Survival of Obligations | 71 |
| 18.07 | Controlling Law | 71 |
| 18.08 | Assignment of Contract..... | 71 |
| 18.09 | Successors and Assigns | 71 |
| 18.10 | Headings..... | 71 |

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
5. *Bidder*—An individual or entity that submits a Bid to Owner.
6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
 - a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 1. does not conform to the Contract Documents;
 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. Abnormal weather conditions;
 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
 2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
 3. Technical Data contained in such reports and drawings.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.
- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
 4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 Differing Subsurface or Physical Conditions

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
 1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 Hazardous Environmental Conditions at Site

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
 2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 1. include at least the specific coverages required;
 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur:* Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities:* Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 Receipt and Application of Property Insurance Proceeds

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 Contractor's Means and Methods of Construction

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 Supervision and Superintendence

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 Labor; Working Hours

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 Services, Materials, and Equipment

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 "Or Equals"

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
 - B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
 - C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
 - D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 Patent Fees and Royalties

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- B. ***To the extent that materials and supplies are used or incorporated in the performance of this Contract, the Contractor is considered an exempt purchaser under the Massachusetts Sales Act, Chapter 14 of the Acts of 1966.***

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during

construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
- K. ***The Contractor must comply with all Federal, State, and Local safety laws and regulations of the applicable work to be performed under this Contract.***
- L. ***If the Contractor uses or stores toxic or hazardous substances it is subject to M.G.L. c.111F §2, the "Right to Know" law and regulations promulgated by the Department of Public Health, 105 CMR 670, the Department of Environmental Protection, 310 CMR 33, and the Department of Labor and Workforce Development, 441 CMR 21; and must post a Workplace Notice obtainable from the Department of Labor and Workforce Development.***
- M. ***The Contractor must comply with Dig-Safe Laws. Dig-Safe is the Utility Underground Plant Damage Prevention System, 331 Montvale Ave., Woburn, MA 01801, 1.888.344.7233. The Contractor must notify Dig-Safe of contemplated excavation, demolition, or explosive work in public or private ways, and in any utility company right of way or easement, by certified mail, with a copy to Department of Environmental Protection (DEP). This notice must be given at least 72 hours prior to the work, but not more than sixty days before the work is to be done. Such notice shall state the name of the street or the route number of the way and an accurate description of the location and nature of the proposed work. Dig-Safe is required to respond to the notice within 72 hours of receipt by designating the location of pipes, mains, wires or conduits at the site. The Contractor shall not commence work until Dig-Safe has responded. The work shall be performed in such manner and with reasonable precautions taken to avoid damage to utilities under the surface at the work location. The Contractor shall provide the Superintendent with current Dig-Safe regulations, and a copy of M.G.L. c.82 §40. Any costs related to the services performed by Dig-Safe shall be borne by the Contractor.***
- N. ***This project is subject to compliance with Public Law 92-596 "Occupational Safety and Health Act of 1970" (OSHA), with respect to all rules and regulations pertaining to construction, U.S. Code Title 29, sections 651 et seq. including Volume 36, numbers 75 and 105, of the Federal Register as amended, and as published by the U.S. Department of Labor.***
- O. ***If this Project requires the containment or removal of asbestos or material containing asbestos, lead or waste containing lead based paint, the Contractor shall ensure that the person or company performing the asbestos or lead related services is licensed pursuant to applicable State laws and regulations.***

7.14 Hazard Communication Programs

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required

to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.
 3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

- a. Contractor shall submit the number of Samples required in the Specifications.
- b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.
5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.
 - d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. *Owner-delegated Designs:* Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or
 - 9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.
- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and

- proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may

impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various

aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 Resident Project Representative

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 Engineer's Authority

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.
- E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 Determinations for Unit Price Work

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 Decisions on Requirements of Contract Documents and Acceptability of Work

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will

not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 Work Change Directives

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.
- B. If Owner has issued a Work Change Directive and:
 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 Field Orders

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 Owner-Authorized Changes in the Work

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 Unauthorized Changes in the Work

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
 1. A mutually acceptable fixed fee; or

2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the

proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.
3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
5. *Binding Decision:* Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion:* Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and

decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval:* If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim:* If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results:* If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 Cost of the Work

- A. *Purposes for Determination of Cost of the Work:* The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which

include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.
 - c. *Construction Equipment Rental*
 - 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
6. Expenses incurred in preparing and advancing Claims.
7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.
- E. *Documentation and Audit:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
 - B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
 - C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
 - D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.
- E. *Adjustments in Unit Price*
1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
 2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other

Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

13.04 Prevailing Wage Rates

- A. *The Director of the Department of Labor and Workforce Development has established a schedule for the prevailing minimum wage rates that must be paid to all workers employed on the Contract. Such Schedule shall continue to be the minimum rate of wages payable to workers on this Contract throughout the term of the Contract. The Contractor shall not have any claim for extra compensation from the Owner if the actual wages paid to employees on the Contract exceeds the rates listed on the Schedule. The Contractor shall cause a copy of said Schedule to be kept in a conspicuous place at the Project site during the term of the Contract. (See M.G.L c.149 §27.) If reserve police officers are employed by the Contractor, they shall be paid the prevailing wage of regular police officers. (See M.G.L c.149 §34B). A current wage determination must be requested through the <https://www.mass.gov/pervailing-wage-program> website.*

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 Tests, Inspections, and Approvals

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
3. by manufacturers of equipment furnished under the Contract Documents;
4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 Uncovering Work

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this

right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and

equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

- submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
 - C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
 - D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
 - E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
 - F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
- e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 Waiver of Claims

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
1. correct the defective repairs to the Site or such adjacent areas;
 2. correct such defective Work;
 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 Owner May Terminate for Cause

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

- attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 Owner May Terminate for Convenience

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 Giving Notice

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 Computation of Times

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 Cumulative Remedies

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 Limitation of Damages

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 No Waiver

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 Survival of Obligations

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 Assignment of Contract

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 Successors and Assigns

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 Headings

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

| | Page |
|--|------|
| Article 1— Definitions and Terminology..... | 1 |
| Article 2— Preliminary Matters | 1 |
| Article 3— Contract Documents: Intent, Requirements, Reuse | 2 |
| Article 4— Commencement and Progress of the Work | 2 |
| Article 5— Site, Subsurface and Physical Conditions, Hazardous Environmental Conditions..... | 2 |
| Article 6— Bonds and Insurance..... | 2 |
| Article 7— Contractor’s Responsibilities | 8 |
| Article 8— Other Work at the Site..... | 8 |
| Article 9— Owner’s Responsibilities | 8 |
| Article 10— Engineer’s Status During Construction | 8 |
| Article 11— Changes to the Contract | 10 |
| Article 12— Claims..... | 10 |
| Article 13— Cost of Work; Allowances, Unit Price Work..... | 10 |
| Article 14— Tests and Inspections; Correction, Removal, or Acceptance of Defective Work..... | 10 |
| Article 15— Payments to Contractor, Set Offs; Completions; Correction Period | 10 |
| Article 16— Suspension of Work and Termination | 11 |
| Article 17— Final Resolutions of Disputes | 11 |
| Article 18— Miscellaneous | 11 |

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added—for example, "Paragraph SC-4.05."

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

No suggested Supplementary Conditions in this Article.

ARTICLE 2—PRELIMINARY MATTERS

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

- A. Owner shall furnish to Contractor **four** printed copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

- D. *Requests by Contractor for Electronic Documents in Other Formats*
 1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.
 2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:
 - a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of

- accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.
- b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.
 - c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.
 - d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.
3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis (at \$200 per hour) for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

No suggested Supplementary Conditions in this Article.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

No suggested Supplementary Conditions in this Article.

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

No suggested Supplementary Conditions in this Article.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2010, 2013, or 2018 edition).

2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2010, 2013, or 2018 edition).

- SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:
- D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following: The Town of Dracut School District
- E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

| Workers' Compensation and Related Policies | Policy limits of not less than: |
|---|--|
| Workers' Compensation | |
| State | Statutory |
| Applicable Federal (e.g., Longshoreman's) | Statutory |
| Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable | Statutory |
| Employer's Liability | |
| Each accident | \$100,000 |
| Each employee | \$100,000 |
| Policy limit | \$500,000 |

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
 2. damages insured by reasonably available personal injury liability coverage, and
 3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
 - a. Such insurance must be maintained for three years after final payment.

- b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 - 2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 - 3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
 - 4. Underground, explosion, and collapse coverage.
 - 5. Personal injury coverage.
 - 6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
 - 7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
 2. Any exclusion for water intrusion or water damage.
 3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
 4. Any exclusion of coverage relating to earth subsidence or movement.
 5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
 6. Any limitation or exclusion based on the nature of Contractor's work.
 7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.
- I. *Commercial General Liability—Minimum Policy Limits*

| Commercial General Liability | Policy limits of not less than: |
|---|--|
| General Aggregate | \$2,000,000 |
| Products—Completed Operations Aggregate | \$2,000,000 |
| Personal and Advertising Injury | \$2,000,000 |
| Bodily Injury and Property Damage—Each Occurrence | \$1,000,000 |

- J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

| Automobile Liability | Policy limits of not less than: |
|---|--|
| Combined Single Limit | |
| Combined Single Limit (Bodily Injury and Property Damage) | \$1,000,000 |

- K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

| Excess or Umbrella Liability | Policy limits of not less than: |
|-------------------------------------|--|
| Each Occurrence | \$10,000,000 |
| General Aggregate | \$10,000,000 |

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$10,000,000 after accounting for partial attribution of its limits to underlying policies, as allowed above.
- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

| Contractor's Pollution Liability | Policy limits of not less than: |
|---|--|
| Each Occurrence/Claim | \$3,000,000 |
| General Aggregate | \$3,000,000 |

- N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The

retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

| Contractor's Professional Liability | Policy limits of not less than: |
|--|--|
| Each Claim | \$1,000,000 |
| Annual Aggregate | \$2,000,000 |

- O. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly referred to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.

| Unmanned Aerial Vehicle Liability Insurance | Policy limits of not less than: |
|--|--|
| Each Claim | \$3,000,000 |
| General Aggregate | \$3,000,000 |

- Q. *Other Required Insurance: N/A*

6.04 *Builder's Risk and Other Property Insurance*

SC-6.04 Delete Paragraph 6.04.A and insert the following in its place:

- A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

- F. *Builder's Risk Requirements:* The builder's risk insurance must:

1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).
 - a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.

- b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.
- 2. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
- 3. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of contractors, engineers, and architects).
- 4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
- 5. extend to cover damage or loss to insured property while in transit.
- 6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.
- 7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.
- 8. include performance/hot testing and start-up, if applicable.
- 9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.
- 10. include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:

a. **The Town of Dracut School District**

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

- G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 Labor; Working Hours

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be **Monday – Friday 7:00am – 6:00pm**
2. Owner's legal holidays are

ARTICLE 8—OTHER WORK AT THE SITE

No suggested Supplementary Conditions in this Article.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.13 Owner's Site Representative

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

9.13 Owner's Site Representative

- A. Owner will furnish an “Owner’s Site Representative” to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner’s Site Representative is not Engineer’s consultant, agent, or employee. Owner’s Site Representative will be Mark Hamel, PE. The authority and responsibilities of Owner’s Site Representative follow: **Town Engineer**

ARTICLE 10—ENGINEER’S STATUS DURING CONSTRUCTION

10.03 Resident Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

- C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.
2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
3. *Liaison*
 - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

- b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.
 - 4. *Review of Work; Defective Work*
 - a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Observe whether any Work in place appears to be defective.
 - c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.
 - 5. *Inspections and Tests*
 - a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.
 - b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.
 - 6. *Payment Requests:* Review Applications for Payment with Contractor.
 - 7. *Completion*
 - a. Participate in Engineer's visits regarding Substantial Completion.
 - b. Assist in the preparation of a punch list of items to be completed or corrected.
 - c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.
 - d. Observe whether items on the final punch list have been completed or corrected.
- D. The RPR will not:
- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
 - 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
 - 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
 - 4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.
 - 5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
 - 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
 - 7. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

No suggested Supplementary Conditions in this Article.

ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.03 Unit Price Work

SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. Adjustments in Unit Price

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the extended price of a particular item of Unit Price Work amounts to **25** percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than **25** percent from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

No suggested Supplementary Conditions in this Article.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.03 Substantial Completion

SC-15.03 Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

15.08 Correction Period

SC-15.08 Add the following new Paragraph 15.08.G:

- G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be **2** years after Substantial Completion.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No suggested Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

No suggested Supplementary Conditions in this Article.

ARTICLE 18—MISCELLANEOUS

No suggested Supplementary Conditions in this Article.

WORK CHANGE DIRECTIVE NO.: _____

Owner: Town of Dracut Owner's Project No.:
Engineer: Hoyle, Tanner & Associates, Inc. Engineer's Project No.: 21.926301.00
Contractor: Contractor's Project No.:
Project: Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools
Contract Name: Pedestrian Safety & Traffic Circulation Improvements Project
Date Issued: Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments:

Purpose for the Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Non-agreement on pricing of proposed change. Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: \$ [increase] [decrease] [not yet estimated].

Contract Time: days [increase] [decrease] [not yet estimated].

Basis of estimated change in Contract Price:

Lump Sum Unit Price Cost of the Work Other

Recommended by Engineer

Authorized by Owner

By: _____

Title: _____

Date: _____

CHANGE ORDER NO.: _____

| | | |
|----------------|---|--------------------------------------|
| Owner: | Town of Dracut | Owner's Project No.: |
| Engineer: | Hoyle, Tanner & Associates, Inc. | Engineer's Project No.: 21.926301.00 |
| Contractor: | | Contractor's Project No.: |
| Project: | Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools | |
| Contract Name: | Pedestrian Safety & Traffic Circulation Improvements Project | |
| Date Issued: | Effective Date of Change Order: | |

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments:

Change in Contract Times
[State Contract Times as either a specific date or a
number of days]

| Change in Contract Price | Original Contract Times: Substantial Completion: _____ Ready for final payment: _____ |
|--|--|
| Original Contract Price: \$ _____ | Original Contract Times: Substantial Completion: _____ Ready for final payment: _____ |
| [Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous Change Order]: \$ _____ | [Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous Change Order]: Substantial Completion: _____ Ready for final payment: _____ |
| Contract Price prior to this Change Order: \$ _____ | Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____ |
| [Increase] [Decrease] this Change Order: \$ _____ | [Increase] [Decrease] this Change Order: Substantial Completion: _____ Ready for final payment: _____ |
| Contract Price incorporating this Change Order: \$ _____ | Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____ |

Recommended by Engineer (if required)

Accepted by Contractor

| | |
|--|-------|
| By: _____ | _____ |
| Title: _____ | _____ |
| Date: _____ | _____ |
| Authorized by Owner _____ | |
| Approved by Funding Agency (if applicable) _____ | |
| By: _____ | _____ |
| Title: _____ | _____ |
| Date: _____ | _____ |

FIELD ORDER NO.: _____

Owner: Town of Dracut Owner's Project No.:
Engineer: Hoyle, Tanner & Associates, Inc. Engineer's Project No.: 21.926301.00
Contractor: Contractor's Project No.:
Project: Pedestrian Safety & Traffic Circulation Improvements Project, Dracut Public Schools
Contract Name: Pedestrian Safety & Traffic Circulation Improvements Project
Date Issued: Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference:

Specification Section(s):

Drawing(s) / Details (s):

Description:

Attachments:

Issued by Engineer

By: _____

Title: _____

Date: _____

TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

C111 – Advertisement for Bids
C200 – Instructions to Bidders
C410 – Bid Form
C430 – Bid Bond (Penal Sum Form)
C435 – Bid Bond (Damages Form)
C451 – Qualifications Statement
C510 – Notice of Award
C520 – Agreement
C550 – Notice to Proceed
C610 – Performance Bond
C612 – Warranty Bond
C615 – Payment Bond
C620 – Contractor’s Application for Payment
C625 – Certificate of Substantial Completion
C626 – Notice of Acceptability
C700 – General Conditions
C800 – Supplementary Conditions
C940 – Work Change Directive
C941 – Change Order
C942 – Field Order

DIVISION 01 – GENERAL REQUIREMENTS

Section 000110 – Table of Contents
Section 010000 – Special Conditions
Section 010250 – Measurement and Payment
Section 011000 – Summary of Work
Section 011200 – Contract Considerations
Section 011300 – Administration of Work
Section 012900 – Payment Procedures
Section 013100 – Project Management and Coordination
Section 013300 – Submittal Procedures
Section 014000 – Quality Requirements
Section 014200 – References
Section 014325 – Testing Agencies
Section 015000 – Temporary Facilities and Controls
Section 015726 – Site Watering for Dust Control
Section 016000 – Product Requirements
Section 017400 – Protection, Care & Restoration of Property & Utilities
Section 017700 – Closeout Procedures

Section 017839 – Project Record Documents
Section 019000 – Permits

DIVISION 02 – EXISTING CONDITIONS

Section 023219 – Exploratory Excavation
Section 024100 – Selective Demolition

DIVISION 26 – ELECTRICAL

Section 260534 – Conduit

DIVISION 31 – EARTHWORK

Section 311000 – Site Clearing
Section 311200 – Demolition
Section 311390 – Pre- and Post-Construction Surveys
Section 312000 – Earth Moving for Utilities and Pavement
Section 312200 – Earthwork
Section 312295 – Support of Excavation
Section 312300 – Trench Excavation
Section 312319 – Dewatering
Section 312400 – Rock Excavation
Section 312500 – Erosion and Sedimentation Controls
Section 313100 – Noise and Dust Control

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 321123 – Aggregate Base Course
Section 321216 – Asphalt Paving
Section 321613 – Granite Curb
Section 321817 – Poured-In-Place Rubber Safety Surface
Section 329000 – Planting
Section 329119 – Landscaping

DIVISION 33 – UTILITIES

Section 333913 – Manholes, Frames and Covers
Section 334100 – Storm Utility Drainage Piping
Section 334413 – Catch Basins

DIVISION 34 – TRANSPORTATION

Section 343000 – Traffic Control

END OF TABLE

**SECTION 010000
SPECIAL CONDITIONS**

PART 1 – GENERAL

1.1 The SPECIAL CONDITIONS specify and summarize selected project requirements for the Contractor's easy reference. It is not intended to provide all requirements. Refer to Technical Specifications and Drawings for details.

1.2 CONTRACT DOCUMENTS

A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

1.3 GENERAL

A. Special requirements of work for this project consist generally of those measures required to assure continuous availability and use of all private and public utilities in the area of the work and those measures required to minimize the impact of the CONTRACTOR's operations on the environment, neighboring properties, and the general public. Interim construction milestones, scheduling restrictions, or special security measures, as they apply, are also included.

1.3 SUBMITTALS AND CERTIFICATIONS

A. Submittals and certifications for the following items of work in this section shall be furnished in accordance with Section 013300 SUBMITTALS.

B. Two (2) copies of the results of any dye testing work, as specified herein, shall be submitted to the ENGINEER by the CONTRACTOR in accordance with Section 013000 - SUBMITTALS. Information to be included in the testing report(s) shall include, but is not necessarily limited to, the date of the test, the time of the test, the name of the property owner, the address where the test was conducted and the results of the test.

C. The name of the Contractor's designated on-site health and safety person(s) for this project. The information shall include, telephone number(s), pager number(s), fax number(s), e-mail address and/or other relevant contact information. Submittal information shall also include the program or programs under which the health and safety person(s) is trained and qualified.

1.4 DEFINITIONS

- A. Massachusetts Department of Transportation "Standard Specifications for Highways and Bridges" (latest edition) shall be referred to as MassDOT Specifications herein.
- B. The OWNER of the project is the Town of Dracut, Massachusetts.
- C. The ENGINEER of the project is Hoyle, Tanner & Associates, Inc. (Hoyle Tanner).

1.5 CONSTRUCTION INTENT

- A. This Town funded project involves the construction of the reconfiguration of the existing parking areas driveways, access points, crosswalks, bus/parent drop off locations, landscaping, new greenspace, recess areas, playground upgrades and repaving. Roadway work will include reclaim, reshape, and repave binder course only to limits shown on the plans, sidewalk construction/reconstruction, installation of stormwater Best Management Practice (BMP) structures, drainage, and pedestrian improvements.

1.6 CONTRACT TIME

- A. Since time is of the essence, work is anticipated to start on June 28, 2022 and must be substantially completed by August 25, 2022. Final Completion must be achieved by September 1, 2022 for the base bid. Additional time will be allowed for the alternates. The CONTRACTOR should note that liquidated damages in the amount of \$1,000/day will be levied for every calendar day exceeding the specified contract time.
- B. The Work shall be completed Monday through Friday during daylight hours (**7 AM to 6 PM**) unless specifically noted otherwise. No work shall be allowed on federal holidays or the day after Thanksgiving. Requests to perform nighttime or weekend operations must be approved by the Owner at least 2 weeks prior to the anticipated construction operations. Additional costs associated with nighttime or weekend operations will be at the Contractor's expense.

1.7 SUBSTANTIAL COMPLETION

- A. Prior to the issuance of a Certificate of Substantial Completion, all Work must be complete and tested except final wearing course paving and minor site cleanup.

1.8 HIERARCHY OF DOCUMENTS

- A. Plans will govern Technical Specifications;
- B. Technical Specifications and Plans will govern Supplementary Conditions and General Conditions;
- C. Supplementary Conditions shall govern General Conditions;

- D. Special Conditions will govern Technical Specifications, Plans, Supplementary Conditions, and Modified General Conditions;
- E. The Agreement supersedes all other Contract Documents.

1.9 SEQUENCING OF WORK

- A. The CONTRACTOR shall be prepared to commence work no later than the date on the Notice to Proceed. All work must be substantially completed by August 25, 2022 for the base bid.
- B. To avoid significant disruption to pedestrians and traffic, the Contractor shall complete utility, drainage, and roadway work (excluding sidewalks) to binder pavement on a limited number of areas at any one time on the project site prior to any earth disturbance (excavation, pavement/sidewalk removal, etc.) elsewhere on the project. The intent of this requirement is to limit the total amount of exposed soils subject to erosion and dust.
- C. The Contractor shall submit, in writing to the Owner and Engineer, a detailed work plan at or prior to the Pre-Construction meeting and prior to commencing construction. This plan shall demonstrate the sequence of work and demonstrate how water, sewer, gas, and drainage service will be continuous throughout the project. The work plan submission shall include a separate traffic control plan.
- D. The Contractor shall maintain vehicle access during construction. The Contractor shall maintain one passable lane for traffic and emergency vehicles on all roads throughout the project.
- E. Contractor shall employ best management practices to control nuisance dust throughout the project including application of water and calcium chloride, and sweeping accumulated dust from pavement as necessary, and as required by the Owner and Engineer.
- F. CONTRACTOR's Means and Methods are at his/her discretion so long as the Work is being executed in compliance with the Contract Documents. The CONTRACTOR's attention is directed to the following elements of the project that should be considered in the CONTRACTOR's development of his/her schedule and the sequencing of work:

1.10 CONSTRUCTION MILESTONES

- A. The CONTRACTOR is reminded that Time is of the Essence in completing the Work.
- B. All construction Work must be completed within the time of substantial completion as specified elsewhere in the Contract Documents

1.11 ENVIRONMENTAL CONCERNS

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Trees and shrubs are to be protected by the CONTRACTOR as noted on the Drawings. The CONTRACTOR shall, prior to construction, encircle trees or shrubs located within construction easements with a wooden barricade to protect them. The CONTRACTOR's Arborist shall gain approval from the Town of Dracut prior to trimming, pruning, or removing any trees. Any trees or shrubs damaged during construction by the CONTRACTOR, or any of his subcontractors, shall be replaced by the CONTRACTOR at his own expense. Trees and shrubs located within the construction easement shall be removed if necessary, as directed by the ENGINEER, unless otherwise indicated, and shall be replaced so as to return the property, as closely as practicable, to its original conditions. Photographs will be taken prior to clearing to establish original conditions.
- B. Due to the potential for adverse impact on the environment by excess site disturbance the CONTRACTOR shall be required to minimize the extent of disturbance by construction operations as much as possible.

1.12 DYE TESTING

- A. The CONTRACTOR shall perform dye testing if/as required to determine where the sanitary sewer service line from building structures discharges to. The number and location of building structures and connections to be dye tested shall be determined in the field and shall be witnessed by the ENGINEER.
- B. The CONTRACTOR shall be responsible for contacting the property owner and occupant of each structure to be dye tested to schedule a time at which the building sewer service can be accessed for dye testing of the sanitary service connection(s).
- C. The basic procedure involves adding a water-soluble dye to the toilet(s) inside the structure and observing open manhole structures in both the sanitary and storm drain lines in the street to determine the flow path of the dye. The date of the test, the time of the test, the name of the property owner, the address where the test is conducted, and the results of the test shall be recorded in writing by the CONTRACTOR. All testing shall be conducted in the presence of the ENGINEER or a representative of the OWNER.

1.13 FUEL OIL & HAZARDOUS WASTEHANDLING

- A. Should fuel oil, contaminated soils or other contaminated or hazardous materials be encountered during construction, the CONTRACTOR shall follow the requirements of relevant health and safety codes and regulations.
- B. The CONTRACTOR shall have an OSHA-certified health and safety person at the job site during all times when construction work is taking place. The health and safety person shall be fully trained and capable of identifying potential health and safety hazards and the appropriate measures to follow in response to such hazards should they be encountered.

- C. The limits of work with respect to contaminated or hazardous materials that may be encountered during construction are limited to the confines of the trench excavation for pipe and structures along the pipeline alignment.
- D. The CONTRACTOR shall designate a responsible person within his/her employ to initiate remedial action should it become necessary if contaminated or hazardous materials are encountered during construction.
- E. Upon encountering contaminated or hazardous materials, the CONTRACTOR's on-site designated health and safety person shall take such measures as necessary to secure the immediate area for protection of lives and property and, if possible, to prevent the spread of contaminants. The CONTRACTOR or his designated health and safety person shall immediately notify the following.
 - 1. The Resident Engineer
 - 2. The OWNER
 - 3. The Department of Environmental Protection (MaDEP)
- F. The specific course of action to be taken, such as remedial measures, modification of construction procedures, etc. shall be determined by the OWNER, if, and when contaminants are encountered, as appropriate based on the type, nature and extent of materials encountered.

1.14 WASTEWATER SERVICE

- A. The Contractor is responsible for maintaining existing wastewater service during the construction period. This will be applicable to the replacement of the existing gravity sewer lines on all Streets in the project area along with connection of building serves. The Contractor shall coordinate all activities with the OWNER and the ENGINEER.

1.15 DEMOLITION DEBRIS

- A. The Contractor shall be responsible for disposal of demolition debris. All costs including hauling and disposal shall be borne by the Contractor.
- B. Construction debris such as concrete, bituminous pavement, etc., may be recycled or permanently buried outside a certified landfill with prior written approval from the State of Massachusetts. Disposal event must be documented.

1.16 WORK HOURS

- A. Normal work hours shall be between **7 A.M. to 6 P.M. Monday through Friday.** There shall be no work performed outside of normal work hours, or on Saturdays, Sundays or legal holidays, unless written permission is granted by the OWNER.

1.17 DELIVERY OF EXCESS MATERIALS AND SALVAGEABLE EQUIPMENT

- A. The OWNER shall maintain ownership of all excess topsoil, reclaimed asphalt pavement, and clean excavated materials. The Contractor shall deliver such excess materials to a site determined by the OWNER that is within a distance not more than 5 miles from the project site. Other salvageable materials and equipment shall be delivered to the OWNER as directed within the project site.

1.18 PERMITS

- A. An excavation permit and Utility Installers License will be required from the Town of Dracut DPW. A Construction General Permit will be required from the Environmental Protection Agency (EPA).

1.19 TRAFFIC CONTROL

- A. A Traffic Control Plan (TCP) as required in Section 343000-Traffic Control shall be prepared by the Contractor and submitted to the Engineer, for review and will require the approval by the Town of Exeter prior to construction. Construction warning signs must conform to MUTCD standards, as applicable.
- B. At least one lane of traffic passage must be maintained on public roads at all times_(both with and without detours). Traffic shall be controlled during working hours. If, at any time, a Town road is to be closed, the CONTRACTOR shall notify the Town Public Works Department and dispatch center (Police Department 978-957-2123) at least forty-eight (48) hours prior to the closing of the time, location, and expected duration of the closing, provided prior approval of the ENGINEER and OWNER has been obtained. Where only one lane of traffic is maintained on two-way roads, flagmen shall be provided at each end of the construction project for the time that traffic is restricted to one lane.
- C. The Trenches will be backfilled (plates shall only be used with prior approval from the Owner) and roads shall be re-opened to provide safe vehicular and pedestrian traffic at the end of each working day. The Plan shall also include the anticipated number of flaggers to be used for a given work area. Police details shall only be used at major intersections or as required by the Dracut Police Department.

1.20 CONSTRUCTION LAYOUT

- A. Work is to be generally constructed as shown on the drawings. The Contractor will be responsible for all construction layouts. A list of horizontal control points (and coordinates) and TBM's will be provided by the Engineer and confirmed by the Contractor, for reference throughout the project. The Engineer and/or Owner's Representative, together with the Project Superintendent will review utility corridors,

considering utility location markings and Contractor's work plan. The Contractor will advise the Engineer, in advance, of potential conflicts concerning execution of his work. It will be the responsibility of the Contractor to protect and maintain TBM's, layout and control points provided by the Engineer. The Engineer will provide an electronic copy of plans and coordinates to the Contractor upon request to facilitate the Contractor's layout, providing the Contractor executes a release concerning the information transmitted.

1.21 COORDINATION OF WORK WITH OTHER SUBCONTRACTORS

- A. The Contractor is to fully coordinate the work of all subcontractors having a direct contract with the Contractor for performance of work associated with this Contract, including without limitation, surveyors, material supplies, and equipment suppliers. The Contractor must coordinate schedules, delivery dates, staging area, trades and all other work according to these Specifications and the Construction Schedule.

1.22 CONFLICTS AND COORDINATION WITH EXISTING UTILITIES

- A. It will be the Contractor's responsibility to coordinate with the utility companies for identification and re-location, if necessary, of any utilities that are interfering or conflicting with the work shown on the drawings. Loss of production or crew downtime relating to utility work by others will not be considered for additional payment.
- B. In the event of interruption to a water or utility service resulting from accidental breakage resulting from being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with said authority in the restoration of services. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority. If any utility service is interrupted for more than 4 hours, the Contractor shall make provision for temporary service at his own expense until service is resumed. Contractor shall maintain repair parts on-site for emergency repairs to water, sewer, and drainage systems.

1.23 TEMPORARY UTILITIES

- A. The Contractor is responsible for extension of temporary water service to all water users where the existing water service will be disrupted by construction for more than 4 hours. Temporary water service connections should be completed through the existing services, fire service connections, or hose bibs. During the time customers are served by temporary bypass water, the Town will remove the water meter head so customers are not charged for water usage. Temporary water must be potable water compliant with NSF61.

1.24 BURIED UTILITIES AND SERVICE PIPES

- A. Not all service pipes for gas, sewer and water utilities are shown on the drawings but are to be expected for each building unit. The Contractor is expected to coordinate utility markings through Dig Safe, UNITIL, and the Town of Dracut, Water and Sewer

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

Department and Highway Department for drainage before proceeding with this work. Utility Markings for sewer and water are based on information on file and should be considered approximate. Repairs to damaged utilities either shown on the plans or through markings on the ground will not be measured for payment. Direct conflicts with utilities resulting in the need for relocation of utilities will be measured for payment, utilizing contract unit items, as deemed appropriate by the Engineer. Additional compensation beyond unit items for loss of production, delays or downtime will not be considered.

- B. The approximate locations of known public and private water supplies and existing utilities are shown on the plans, however, the CONTRACTOR is responsible for maintaining all water supply, all service from existing utilities, and sewer service, whether such service is indicated on the plans or not.
- C. All costs associated with protection of or relocation of existing utilities during construction will be the responsibility of the CONTRACTOR as provided in Section 017410, PROTECTION, CARE and RESTORATION OF PROPERTY and UTILITIES. The CONTRACTOR shall include costs for such work under the appropriate bid items.
- D. During the planning and design of the project, the following utilities were contacted and have received review copies of the drawings:
 - 1. Dracut Public Works and Engineering Department
Mark Hamel, PE, Town Engineer
Ph: 978-454-2594 mhamel@dracutma.gov
- E. The CONTRACTOR shall contact **DIG SAFE (1-888-DIG-SAFE), Dracut DPW (978-957-0411)** and the utility companies listed herein prior to commencing construction operations to determine and mark, in the field, the locations of any and all existing utilities in the project area. The CONTRACTOR is responsible for coordination of his work and operations with the various utility companies and for protection of existing utilities during construction. Should any existing utility need to be temporarily or permanently relocated due to construction under this Contract, the CONTRACTOR shall closely coordinate this work with his own operations, with the affected utility company, with the ENGINEER and with the OWNER.
- F. The CONTRACTOR shall at all times conduct his operations so as to interfere as little as possible with existing works. The CONTRACTOR shall develop a program, in cooperation with the ENGINEER, the OWNER, and interested officials, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted. All work of connecting with, cutting into, and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time when the demands on the facilities best permit such interference, even though it may be necessary to work outside of normal working hours to meet these requirements. Before starting work which will interfere with the operation of

existing facilities, the CONTRACTOR shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.

1.25 PROTECTION OF PROPERTY

- A. The CONTRACTOR shall take the necessary precautions to avoid any damage to existing trees, shrubs, lawns, plantings, mail boxes, utility poles, property boundaries, fences, and private property. Should any damage occur, the CONTRACTOR shall be responsible to repair/replace the damaged items to the satisfaction of the OWNER and the property owner.
- B. The CONTRACTOR shall not enter private property without first obtaining written permission from the property owner(s).
- C. The CONTRACTOR shall confine his operations to property owned by the TOWN OF DRACUT and to those areas shown on the Contract Drawings.
- D. The CONTRACTOR shall make special efforts not to interfere with the normal activities of residents and/or businesses located on or near Town of Dracut property in the vicinity of the proposed work. Interruption of essential services such as electricity, sewer, water, etc., shall be avoided as much as possible. If essential services to the residents must be interrupted due to construction activities, the out-of-service time shall not exceed 10 hours and shall be confined to daylight hours. If the CONTRACTOR finds he cannot restore services in this time frame, a course of action approved by the OWNER shall be implemented by the CONTRACTOR at his own cost. The OWNER reserves the right to supplement the CONTRACTOR'S efforts or to implement additional efforts, if required, to satisfactorily restore essential services. The OWNER shall be the sole judge of when essential services have been restored and all OWNER costs in connection herewith shall be paid by the CONTRACTOR.
- E. When such services must be interrupted, the CONTRACTOR shall give advance written notice of not less than forty-eight (48) hours to the ENGINEER, the OWNER, and affected residents that essential services will be interrupted.

1.26 MEETINGS (refer to Section 013100):

- A. It is anticipated that regularly scheduled meetings will be held with Owner's Representatives, Contractor, sub-contractors and will be held at a minimum frequency of twice monthly, unless weekly meetings are considered necessary by the Contractor, Owner or Engineer.
- B. Informal weekly meetings are anticipated between the Contractor's Superintendent, Owner, and Resident Project Representative to review progress/schedule, sequence and other day to day issues.

1.27 TEMPORARY EROSION CONTROL

- A. The Contractor shall exercise caution to minimize the intrusion of any spillage, sediment, turbidity, or pollution into the waterways or adjacent properties around the project area. Sediment and erosion controls shall be operational prior to commencing trench de-watering operations.
- B. A Storm Water Pollution Prevention Plan (SWPPP) will be required and must be kept on site at all time. The Contractor will be responsible for filing the Notice of Intent (NOI) and maintaining the SWPPP onsite at all times. The NOI must be submitted to the Environmental Protection Agency (EPA) at least seven (7) days prior to the start of construction. The SWPPP must be in place prior to submittal of the NOI.
- C. The SWPPP may be amended as necessary to provide continued erosion and sediment control throughout the project. Appropriate measures shall be implemented to prevent sedimentation migration resulting from the Contractor's construction operations.

1.28 CONSTRUCTION DEWATERING

- A. Trench dewatering may be required to complete the work. The Contractor shall comply with the EPA's National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Dewatering before proceeding with the work.
- B. This NPDES general permit covers construction dewatering discharges defined as pumped or drained discharges of groundwater and/or storm water from excavations or other points of accumulation associated with a construction activity.
- C. Appropriate sediment and erosion controls shall be operational prior to commencing trench dewatering operations. Construction dewatering is incidental.

1.29 GEOTECHNICAL INFORMATION

- A. N/A

1.30 DUST CONTROL (refer to Section 313100)

- A. Due to the close proximity of homes to the work zone, the Contractor is required to use a mechanically enclosed street sweeper on paved surfaces when necessary to control dust. Water and/or Calcium Chloride are required on unpaved surfaces to control dust. The OWNER will enforce a strict dust control policy for this project as described in the above referenced section.

1.31 PEDESTRIAN TRAFFIC

- A. The work area is in an active school zone and vehicular/pedestrian traffic corridors need to be maintained daily. The Contractor will need to separate work zones from pedestrian corridors.

1.32 STAGING AREA

- A. The Contractor is required to locate and secure all staging and material storage areas. All staging areas to be secured by the Contractor must be approved in advance by the OWNER. Contractor shall provide a Hold Harmless Release to the OWNER prior to start of use of the staging area.
- B. At the completion of work, the Contractor shall receive a release from the property owner's of the staging area(s) and a copy of each release shall be provided to the OWNER prior to final acceptance of the project.
- C. Private property shall not be used for storage purposes without written permission of the property owner. If requested, copies of such written permission shall be furnished to the Owner and Engineer.
- D. With OWNER approval, the Contractor may use the side of the roadway for staging of pipe, structures (catch basins and manholes), and associated materials providing the following conditions are met (unless approved otherwise by the OWNER).
 - 1. Materials are to be placed no sooner than one (1) week preceding installation.
 - 2. Sidewalks and driveways are unimpeded and a minimum of 20 feet of roadway is maintained as a smooth traveling surface for vehicular traffic.
 - 3. That the Contractor will relocate structures upon notification by the Town, if deemed necessary to maintain public relations and/or public safety.
 - 4. Appropriate traffic cones and barriers are installed around area.

1.33 PRECONSTRUCTION VIDEO

- A. Preconstruction digital photographs or video of the entire construction site including all areas within the scope of work and access roads leading to construction areas, shall be completed or recorded and provided by the Contractor to the Owner two weeks prior to start of work. Photographs shall be provided as electronic photo digital images. The video shall be supplied in digital format on a thumb drive (USB compatible) as approved by Engineer. Three copies of the digital photo log or video shall be prepared and provided one each to the Owner, Engineer and Contractor.

1.34 SAMPLES AND TESTING

- A. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction. No materials will be placed without review by the Engineer. All compaction and material testing will be paid for by the Contractor, with oversight by the Engineer.

1.35 PAVEMENT MARKINGS

- A. Temporary pavement markings, to match the existing pavement markings, are subsidiary. Permanent pavement markings are to be reviewed with the Owner's Representative prior to placement. Markings not approved shall be removed at the Contractor's own expense, if requested by the Owner.

1.36 SALVAGE OF MATERIALS

- A. Existing fire hydrants shall be salvaged to the Town of Dracut. All items selected by the OWNER for salvage shall be delivered to a location specified by the OWNER. The OWNER has the right to salvage additional materials as requested. Contractor is to coordinate delivery of materials within the OWNER.

1.37 ABANDONMENT OF EXISTING PIPE

- A. All cast iron water pipes shall be plugged at any exposed ends with grout. All sewer pipes to be abandoned shall be filled with flowable fill or removed. All pipes and structures within the excavation limits shall be removed and disposed of by the Contractor at his own cost.

1.38 VIBRATION MONITORING

- A. Vibration Monitoring required by state and local ordinances, will be provided by the Contractor upon request, if deemed necessary to monitor vibration resulting from the contractor's equipment, compaction efforts or operations. Vibration monitoring for rock splitting or other means of ledge/rock removal operations (blasting is prohibited on this project) is provided at the Contractor's own expense.

1.39 PROTECTION OF TREES

- A. The Contractor will endeavor to prevent damage to all trees within the right-of-way, within easements for the work and immediately adjacent to the work zone.
- B. An arborist may be engaged by the Contractor to provide expertise for the preservation of mature trees in the project limits. The arborist shall provide services including, but not limited to, limbing, root protection, root pruning, watering plan and other recommendations as deemed appropriate to preserve mature trees within or immediately adjacent to the work zones.
- C. A penalty will be assessed to the Contractor for unnecessary damage to trees as follows:
 1. Limbs damaged following trimming: \$100/limb (in addition limbs will require further trimming by Contractor as directed)
 2. Tree bark or surface scarring: \$10/sq. in. of impact area (\$100 MIN. and \$1000 MAX.) In addition, Contractor shall remove trees that are, in the opinion of the Owner, significantly altered or cosmetically impaired or terminally damaged.

PART 2 – PRODUCTS (Not Used)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 010250

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.0 SECTION INCLUDES

- A. Payments to the Contractor will be made in accordance with the General Conditions of this specification.
- B. Payment for "extra work", authorized in writing by the Owner shall be made upon completion of the "extra work" to the satisfaction of the Owner and in the amount agreed upon at the time of authorization.
 - 1. Terms of such payment shall be as stated in the General Conditions.
- C. All work shall be constructed as noted below. Payment for any lump sum bid item shall be based on an approved schedule of values detailing work to be accomplished under the specific item.

1.1 MOBILIZATION, BONDS, INSURANCE (Bid Item 1)

- A. Under Bid Item 1, the Contractor shall be paid the lump sum price for mobilization to the site as outlined in Section 01010 and as indicated in the Contract documents. Payment shall be full compensation for movement of all equipment and materials to and from the site, associated bonds and insurance. The value of Bid Item 1 shall not exceed 10% of the total bid price.

1.2 TREES & SHRUBS, MISC. LANDSCAPING (Bid Item 2)

- A. Under Bid Item 2, the Contractor shall be paid the unit price bid for the removal and disposal of all small trees, stumps, roots, logs, shrubs, grass, weeds and surface litter necessary as shown on the Contract documents.
- B. Other identified bid items are excluded from the lump sum price bid including Erosion and Sediment Controls.

1.3 EXISTING TREE MITIGATION (Bid Item 3)

- A. Under Bid Item 3, the Contractor shall be paid the lump sum price bid for existing tree mitigation as indicated in the Contract documents.

1.4 LANDSCAPE RESTORATION (Bid Item 4)

- A. Under Bid Item 4, the Contractor shall be paid the lump sum price bid for landscape restoration as indicated in the Contract documents.

1.5 LOAM & SEED (Bid Item 5)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Under Bid Item 5, the Contractor shall be paid per the square yard unit price bid for loam & seed as indicated in the Contract documents. All associated installation costs, fertilizers, lime, soil supplements, tackifiers etc. is subsidiary and shall be paid for under Bid Item 5.

1.6 MAINTENANCE OF TRAFFIC & PEDESTRIANS (Bid Item 6)

- A. Under Bid Item 6, the Contractor shall be paid the lump sum price bid for creating and implementing a traffic control plan with flaggers including installing and maintaining all signage, cones, portable message boards and other measures in accordance with Town of Dracut and the Dracut Public Schools, to maintain traffic and pedestrian safety for the duration of the project.

1.7 FLAGGERS (Bid Item 7)

- A. Under Bid Item 7, the Contractor shall be paid the hourly price bid for flaggers to maintain the safety of traffic and pedestrians as indicated in the contract documents. Invoices to be submitted with payment.

1.8 STABILIZED CONSTRUCTION ENTRANCE (Bid Item 8)

- A. Under Bid Item 8, the Contractor shall be paid the lump sum price bid for a construction entrance as indicated in the contract documents. Stabilized Construction Entrance shall be maintained throughout the entirety of the project.

1.9 EROSION CONTROL & SWPPP W/ MONITORING (Bid Item 9)

- A. Under Bid Item 9, the Contractor shall be paid the lump sum price bid for the installation and maintenance of sedimentation and erosion control measures in accordance with Specification Section 312500 and as identified in the Contract documents.

1.10 SAWCUT PAVEMENT (Bid Item 10)

- A. Under Bid Item 10, the Contractor shall be paid the per linear foot unit price bid for sawcutting of pavement as indicated in the Contract documents.

1.11 REMOVE & DISPOSE OF CURBING (Bid Item 11)

- A. Under Bid Item 11, the Contractor shall be paid the per linear foot unit price bid for removal and disposal of existing curbing as indicated in the Contract documents.

1.12 ROCK EXCAVATION (Bid Item 12)

- A. Under Bid Item 12, the Contractor shall be paid the per cubic yard unit price bid for the excavation of rock as shown on the contract documents.
- B. Payment for rock removal shall be by the cubic yard and constitute full compensation for drilling, hammering, removal, disposal, refill and for all labor, equipment, materials and incidental work necessary for the satisfactory completion of the work under item 12.

1.13 COMMON EXCAVATION (Bid Item 13)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Under Bid Item 13, the Contractor shall be paid the per cubic yard unit price bid for the excavation of common materials as shown on the Contract documents.
- 1.14 EXPLORATORY EXCAVATION / TEST PIT (Bid Item 14)
- A. Under Bid Item 14, the Contractor shall be paid the per each price bid for exploratory excavation and/test pits for investigation of existing utilities. Typical test pit to be 6 feet deep.
- 1.15 EXISTING PIPE REMOVAL (ALL SIZE & TYPE, INCL. HAZARDOUS) (Bid Item 15)
- A. Under Bid Item 15, the Contractor shall be paid the per linear foot unit price bid for existing pipe removal as indicated in the Contract documents. Removal, disposal, refill and for all labor, equipment, materials and incidental work necessary for the satisfactory completion of the work under item 15.
- 1.16 REMOVE & DISPOSE OF EXISTING DRAINAGE STRUCTURES (Bid Item 16)
- A. Under Bid Item 16, the Contractor shall be paid the per each unit price bid for the removal and disposal of each existing drainage structure as indicated in the Contract documents. Removal, disposal, refill and for all labor, equipment, materials and incidental work necessary for the satisfactory completion of the work under item 16.
- 1.17 NEW SIGNS (Bid Item 17)
- A. Under Bid Item 17, the Contractor shall be paid the per each unit price bid for the purchase and installation of new signs as indicated in the Contract documents.
- 1.18 RELOCATE SIGNS (Bid Item 18)
- A. Under Bid Item 18, the Contractor shall be paid the per lump sum price bid for the removal, relocation, and re-installation of existing signs as indicated in the Contract documents.
- 1.19 NEW LIGHT POLES (Bid Item 19)
- A. Under Bid Item 19, the Contractor shall be paid the per each unit price bid for the installation of each new light pole as indicated in the Contract documents. All new conduit and electrical wire, circuitry and electrical work is subsidiary to item 19. All work to conform to local electrical codes. All associated excavation, gravels, bedding, and backfill is subsidiary and shall be paid for under Bid Item 19.
- 1.20 RELOCATE LIGHT POLES (Bid Item 20)
- A. Under Bid Item 20, the Contractor shall be paid the per each unit price bid for the removal, relocation, and re-installation of the existing light poles as indicated in the Contract documents. The conduit and electrical wire, circuitry and electrical work is subsidiary to item 20. All work to conform to local electrical codes. All associated excavation, gravels, bedding, and backfill is subsidiary and shall be paid for under Bid Item 20.
- 1.21 RELOCATE FIRE HYDRANTS (Bid Item 21)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Under Bid Item 21, the Contractor shall be paid the per each unit price bid for removing, relocating and re-installing fire hydrants assemblies, complete, including 8"x6" water main tees, associated 6" piping, valves, valve boxes to grade, thrust blocks, excavation, bedding, backfill, and dewatering as shown on the Contract documents.
- 1.22 DENSE GRADED CRUSHED STONE (M2.01.7) (Bid Item 22)
- A. Under Bid Item 22, the Contractor shall be paid the per installed cubic yard unit price bid for dense graded crushed stone as indicated in the Contract documents.
- 1.23 GRAVEL BORROW (MASSDOT M1.03.0 TYPE "B") (Bid Item 23)
- A. Under Bid Item 23, the Contractor shall be paid the per cubic yard unit price bid for gravel borrow MASSDOT M1.03.0 Type "B" as indicated in the contract documents.
- 1.24 SUPERPAVE SURFACE COURSE (12.5) (Bid Item 24)
- A. Under Bid Item 24, the Contractor shall be paid the per installed ton unit price bid for superpave surface course (12.5).
- 1.25 SUPERPAVE INTERMEDIATE COURSE (19.0) (Bid Item 25)
- A. Under Bid Item 25, the Contractor shall be paid the per installed ton unit price bid for superpave intermediate course (19.0).
- 1.26 12" FULL DEPTH RECLAMATION (Bid Item 26)
- A. Under Bid Item 26, the Contractor shall be paid the square yard unit price bid for 12" full depth reclamation as indicated in the contract documents.
- 1.27 1.5" PAVEMENT MICROMILLING (Bid Item 27)
- A. Under Bid Item 27, the Contractor shall be paid the per removed square yard unit price bid for 1.5" of pavement micromilling as indicated in the Contract documents.
- 1.28 FINE GRADING (Bid Item 28)
- A. Under Bid Item 28, the Contractor shall be paid the per square yard unit price bid for fine grading and shimming to prep for pavement and concrete as indicated in the Contract documents.
- 1.29 SPEED TABLE (Bid Item 29)
- A. Under Bid Item 29, the Contractor shall be paid the per each unit price bid for the speed table as indicated in the Contract documents.
- 1.30 STRAIGHT VERTICAL GRANITE CURB (Bid Item 30)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Under Bid Item 30, the Contractor shall be paid the per linear foot unit price bid for installing straight vertical granite curbing as indicated in the Contract documents. All associated excavation, concrete, bedding, and backfill is subsidiary and shall be paid for under Bid Item 30.
- 1.31 CURVED VERTICAL GRANITE CURB (Bid Item 31)
- A. Under Bid Item 31, the Contractor shall be paid the per linear foot unit price bid for installing curved vertical granite curbing as indicated in the Contract documents. All associated excavation, bedding, concrete and backfill is subsidiary and shall be paid for under Bid Item 31.
- 1.32 4" CONCRETE SIDEWALK (Bid Item 32)
- A. Under Bid Item 32, the Contractor shall be paid the per square yard unit price bid for furnishing and installing 4" concrete sidewalks as indicated on the Contract documents. All associated excavation, gravels, bedding, reforcing and backfill is subsidiary and shall be paid for under Bid Item 32.
- 1.33 TRUNCATED DOME WARNING PANEL (Bid Item 33)
- A. Under Bid Item 33, the Contractor shall be paid the per each installed unit price bid for the purchase and installation of new truncated dome warning panels as indicated in the Contract documents.
- 1.34 4" WHITE PAVEMENT MARKINGS – RETROREFLECTIVE (Bid Item 34)
- A. Under Bid Item 34, the Contractor shall be paid the per installed linear foot unit price bid for painting 4" white pavement markings (retroreflective) as indicated in the Contract documents.
- 1.35 12" WHITE PAVEMENT MARKINGS - RETROREFLECTIVE (Bid Item 35)
- A. Under Bid Item 35, the Contractor shall be paid the per installed linear foot unit price bid for painting 12" white pavement markings (retroreflective) as indicated in the Contract documents.
- 1.36 WHITE TRAFFIC ARROWS AND SYMBOLS - RETROREFLECTIVE (Bid Item 36)
- A. Under Bid Item 36, the Contractor shall be paid the per each installed unit price bid for painting white traffic arrows and symbols as pavement markings (retroreflective) as indicated in the Contract documents.
- 1.37 12" HDPE DRAINAGE PIPE (Bid Item 37)
- A. Under Bid Item 37, the Contractor shall be paid the linear foot unit price bid for furnishing and installing all 12-inch diameter HDPE drainage pipe as indicated on the Contract documents.
 - B. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 37.
- 1.38 15" HDPE DRAINAGE PIPE (Bid Item 38)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Under Bid Item 38, the Contractor shall be paid the linear foot unit price bid for furnishing and installing all 15-inch diameter HDPE drainage pipe as indicated on the Contract documents.
 - B. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 38.
- 1.39 DRAIN MANHOLE (Bid Item 39)
- A. Under Bid Item 39, the Contractor shall be paid the per each unit price bid for furnishing and installing drain manholes as indicated on the Contract documents including all appurtenances and related All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 39.
- 1.40 CATCH BASIN (Bid Item 40)
- A. Under Bid Item 40, the Contractor shall be paid the per each unit price bid for furnishing and installing catch basins as indicated on the Contract documents including all appurtenances and related work. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 40.
- 1.41 FRAME & GRATE (Bid Item 41)
- A. Under Bid Item 41, the Contractor shall be paid the per each unit price bid for furnishing and installing frames & grates as indicated on the Contract documents including all appurtenances and related work. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 41.
- 1.42 ADJUST STRUCTURES (Bid Item 42)
- A. Under Bid Item 42, the Contractor shall be paid per each unit price bid for adjusting structures and raising and lowering of existing manhole covers and grates as indicated in the Contract documents.
- 1.43 DRAINAGE STRUCTURES CHANGE IN TYPE (Bid Item 43)
- A. Under Bid Item 43, the Contractor shall be paid the per each unit price bid for structures and raising and lowering of existing manhole covers and grates change in type as indicated on the Contract documents.
 - B. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 43.
- 1.44 HYDRODYNAMIC SEPARATOR (Bid Item 44)
- A. Under Bid Item 44, the Contractor shall be paid the per each installed unit price bid for a Hydrodynamic Separator as indicated on the Contract documents.
 - B. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 44.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1.45 48" CHAIN-LINK FENCE (Bid Item 45)

- A. Under Bid Item 45, the Contractor shall be paid per linear foot unit price bid to furnish and install 48" chain-link fence as indicated on the Contract documents.
- B. All associated excavation, bedding, concrete and backfill is subsidiary and shall be paid for under Bid Item 45.

1.46 POURED-IN-PLACE RUBBERIZED PLAYGROUND SURFACE (Bid Item 46)

- A. Under Bid Item 46, the Contractor shall be paid per square yard unit price bid to furnish and install rubberized playground surface as indicated in the Contract Documents and Drawings.
- B. All associated excavation, bedding and backfill is subsidiary and shall be paid for under Bid Item 46.

1.47 BITUMINOUS SIDEWALK (Bid ALT #1 Item 23)

- A. Under Bid Item 45, the Contractor shall be paid the square yard per unit price bid for installed bituminous sidewalk as indicated on the contract documents.

1.48 CONCRETE DUMPSTER PAD (Bid ALT #1 Item 33)

- A. Under Bid ALT #1 Item 33, the Contractor shall be paid the per each unit price bid for furnishing and installing a concrete dumpster pad as indicated on the Contract documents.
- B. All associated excavation, bedding, and backfill is subsidiary and shall be paid for under Bid Item 33.

END OF SECTION

SECTION 011000

SUMMARY OF WORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of Article V of the CONTRACT AND GENERAL CONDITIONS.

1.2 REQUIREMENTS INCLUDED

- A. Work under this Contract.
- B. Examination of Site and Documents.
- C. Contract Method.
- D. Definitions.
- E. Work Sequence.
- F. Supervision of Work.
- G. Contractor's Use of Premises.
- H. Coordination.
- I. Field Engineering.
- J. Reference Standards.
- K. Pre-Construction Conference.
- L. Project Meetings.
- M. Permits, Inspection, and Testing Required by Governing Authorities.
- N. Cutting, Coring, Patching, Unless Otherwise Indicated.
- O. Debris Removal.
- P. Field Measurements.
- Q. Emergency Procedures.
- R. Safety Regulations.
- S. OSHA Safety and Health Course Documentation.
- T. Damage Responsibility.
- U. Owner Occupancy.
- V. Asbestos and Hazardous Materials Discovery.
- W. Special Requirements.

1.3 WORK UNDER THIS CONTRACT

- A. The work to be done under this contract consists of executing and completing all work required for the Pedestrian Safety & Traffic Circulation Improvements Project for the Dracut Public Schools, Dracut, Massachusetts.
- B. The scope of work, without limiting the generality thereof, includes all labor, materials, equipment, permitting and services required to perform the work described fully in the Drawings, Narrative, and Specifications.
- C. Work will include all site removal and new construction for the Pedestrian Safety and Traffic Circulation Improvements Project to reconstruction the road and parking lots near the entrance of the school complex along with drainage improvements, landscaping, and sidewalk construction. Includes full depth reclaim, micromilling & pavement overlay, and construction of new pavement areas. The base bid includes the addition of a new parking area near the entrance of Englesby Elementary School and reconfiguring the current parking lot on the side of Englesby to be two (2) separate parking areas. This also includes the repaving of parking areas to the north of Dracut Senior High and the parking areas to the front and back of Richardson Junior High. Work will include but not be limited to: demolition, asphalt paving, earthwork, curbing, drainage, underground utilities, pavement markings and landscaping as required.
 - 1. General Information
 - a. The Contractor is hereby informed that the facility where the work is to be performed will remain in full operation during the entire course of the project, and that the Contractor and the Subcontractors and all persons associated with the Project shall not interfere with the operations of the Dracut Public School. Contractor to be aware that major bus operations may be from 6-8:30 AM and after 5PM. Contractor shall coordinate all work with the Dracut Public School to ensure smooth business operations.
 - b. Parking Lot Improvements
 - 1) The Project Scope of Work for the base bid includes select demolition, saw-cutting, milling and the removal of all existing pavement and curbing in the project area as delineated on the plans.
 - 2) Removal of existing base materials to a depth of 18" below proposed finished grade.
 - 3) Installation of new drainage manholes, catch basins and minor drainage piping, including hydrodynamic separators.
 - 4) Installation of electrical conduits, wiring, bases, poles, and luminaires for proposed lighting.
 - 5) Installation of gravel base material.
 - 6) Installation of new crushed gravel.
 - 7) Installation of new vertical granite curbing in the project area.
 - 8) Placement of new 4" bituminous pavement.
 - 9) Install all miscellaneous markings, signage and additional items as shown in the contract documents.
 - 10) Add Alternate #1 – Reconstruction of road and parking lots around Brookside Elementary School along with drainage improvements, sidewalk construction, and landscaping as delineated on the plans. Includes full depth reclaim and the construction of new pavement areas. Existing paved areas to the rear of Brookside elementary will experience full depth reclamation.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

This add alt includes the construction of a new paved parking area located where there is an existing gravel lot next to the Football field.

- 11) Add Alternate #2 - Micromilling and pavement overlay of drives and parking as delineated on the plans. This would include the drive that runs behind Richardson Junior High, the drive that runs alongside the baseball fields going to Brookside Elementary, and the drive that runs north to the rear lot of Richardson Junior High.
 - 12) Add Alternate #3 - Addition of a playground with a rubberized surface as delineated on the plans. This includes the creation of a rubberized playground surface along the edge of Englesby Elementary School. This playground would be an expansion of the existing playground area.
 - 13) Overall project cleanup.
2. Project Schedule
- a. Anticipated Notice to Proceed by June 28, 2022
 - b. Allow 8-week construction period for Substantial Completion date of August 25, 2022
 - c. All construction work and punch-list items shall be concluded for Final Completion date no later than September 1, 2022 for the base bid. Additional time will be allowed for alternates.
3. Work Time Restrictions
- a. Work shall not affect traffic patterns during peak traffic periods. Peak traffic periods may be defined as Monday through Friday 7:00AM to 8:30AM and 5:00PM to 7:00PM. Contractor to provide a traffic mitigation plan with flaggers and coordinate with the schools as needed.
- D. The work will include all operations necessary to deliver the project in a fully installed and operable condition including all drainage and electrical connections work and obtaining all necessary licenses, permits, and certificates.
- E. The scope of work, without limiting the generality thereof, includes all labor, materials, equipment and services required to perform the work described fully in the Drawings and Specifications and includes, but is not limited to the following major work:
1. The reconstruction of the pedestrian safety and traffic circulation area as well as all associated improvements, structures, furnishings and amenities.
 2. Installing, inspecting, and maintaining the construction phase erosion and sedimentation control measures in the work area (in accordance with the Construction General Permit), the installation of silt fence and check dams, and the removal of accumulated sediment from the existing stormwater management basin and other areas as required during the project and at the end of the work.
 3. Control and conveyance of stormwater while maintaining compliance with the Owner's Stormwater Discharge Permit, Stormwater Pollution Prevention Plan, and Spill Prevention, Control, and Countermeasures Plan including dust control and maintenance of facility access roads.
 4. Furnishing and installing all materials for the reconstruction of the project.
 5. Furnishing and installing gravel road base material and fabric as needed. Note granular fill, topsoil, gravel road base material, and crushed stone shall be provided by the Contractor; and final grading of the project are as needed.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- F. The Contractor will provide a performance construction schedule prior to the commencement of construction for completion of the project to the Owner within the required construction period. The performance schedule and details provided will be based on the contract schedule.

1.4 EXAMINATION OF SITE AND DOCUMENTS

- A. A pre-bid conference will be held at the time and location indicated in the Invitation to Bid.
- B. Bidders shall visit the site during the pre-bid conference, at the time specified in the advertisement and the bid documents.
- C. The bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which the work is to be carried out. The Owner will not be responsible for errors, omissions, and/or charges for extra work arising from the Contractor's or Subcontractor's failure to familiarize themselves with the contract documents. The Contractor and Subcontractor acknowledge that they are familiar with the conditions and requirements of the contract documents where they require, in any part of the work, a given result to be produced, and that the contract documents are adequate and will produce the required results.
- D. Contact: The designer will be present at the pre-bid conference. This will be the only time available for guided viewing of the site; any further questions preceding the submission of the bid shall be directed to: William Davidson, PE at wdavidson@hoyletanner.com or (603) 501-8541.
- E. No questions from Bidders will be accepted within 5 days of the Bid opening. Questions will be answered in the form of an addendum which will be posted by the Town to all bidders on the plan holders list. Any information provided by other than the designated contact person identified above should be disregarded in the preparation of Bids.

1.5 CONTRACT METHOD

- A. Work under this contract shall be unit price, for the scopes of work as described in these specifications and shown on the Drawings.

1.6 DEFINITIONS - AWARDING AUTHORITY, OWNER, CLIENT, SCHOOL, CONTRACTOR, AND DESIGNER

- A. Wherever the terms "Awarding Authority", "Owner", "Client" or "School" are used in this Project Manual, they refer to:

Dracut Public Schools, Dracut, Massachusetts

1. The terms "Awarding Authority" and "Owner" as used in the Project Manual have the same meaning and are interchangeable in Contract Documents. Both terms refer to the same entity representing the interest of the Dracut Public Schools.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2. Important Tax Note: Awarding Authority is exempt from certain taxes. It is therefore required that the Contractor and all Subcontractors purchasing taxable goods or services make known to suppliers that tax-exempt status of the Owner, in order that such taxes will not be applied to the goods under Contract.
 - a. Fines and Penalties: Contractor and Subcontractors are fully responsible for payment of all penalties and fines accessed by authorities having jurisdiction for improper and illegal use of Awarding Authority's tax exemption certificate number.
 3. All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the contrary, be delivered to the office of the Designer:
- B. Wherever the terms "Architect", "Designer", "Engineer" or "Architect/Engineer", are used in the Contract Documents, they refer to:

Hoyle, Tanner & Associates, Inc.
50 High Street, 4th Floor, Suite 49
North Andover, MA 01845

- C. The terms "Construction Manager", "CM" and "Contractor" as used in the Project Manual have the same meaning and are interchangeable in the Contract Documents. All terms refer to the same entity.
- D. For a list of additional basic contract definitions utilized in the contract documents, refer to Section 014200 – REFERENCES

1.7 WORK SEQUENCE

- A. The Work will be conducted in the following sequence of demolition/construction as shown in the Drawings.
- B. The Contractor shall submit a detailed construction schedule to the Owner and Engineer indicating the dates they intend to begin and complete each part of the work. The Contractor shall submit the schedule to the Engineer at the Pre-Construction Conference. The schedule shall be approved by the Owner and Engineer prior to the commencement of any work.
- C. The Contractor is fully responsible for preparing their detailed construction schedule and completing the work as shown and specified in the Contract Documents.
- D. The Contractor shall perform their work within the hours of 7:00 a.m. to 6:00 p.m. during the regular work week (i.e., Monday through Friday) while classes are not in session. While classes are in session, the Contractor shall not begin any work before 9:00 a.m. without the approval of the Owner. Work shall not interfere with the work of other Contractors or the Owner. Additional scheduling requirements and coordinating with the Dracut Public Schools are shown on the Drawings.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. The anticipated construction start date is June 28, 2022. The date of Substantial Completion is August 25, 2022. The date of Final Completion is September 1, 2022 for 100% completion of work for the base bid. Additional time will be allowed for the alternates.
- F. The Contractor shall submit fencing, detour, traffic management plans and pedestrian management for approval by the Owner and Engineer at the Pre-Construction Conference. Traffic, phasing and pedestrian plans shall be submitted by the Contractor to the Dracut Public Schools for posting on the school website, if needed.
- G. No extension will be granted, and liquidated damages will be assessed if the project is completed after the Substantial Completion Deadline.
- H. If conditions are such that the work must be suspended at any time, it will be suspended only by written authorization from the Owner and only for such period of time approved. Depending on the reason, the period of such suspension of work may be excluded from the time limits established. During such suspensions, or during any period of general inactivity on the project, all material and equipment delivered to the site of the work shall be properly stored and protected.
- I. The Contractor shall keep a copy of the Contract Documents on the premises at all times.

1.8 SUPERVISION OF WORK

- A. The Contractor shall be held directly responsible for the correct installation of all work performed under this Contract. The Contractor must make good repair, without expense to the Owner, of any part of the new work, or existing work to remain, which may become inoperative on account of leaving the work unprotected or unsupervised during construction of the system or which may break or give out in any manner by reason of poor workmanship, defective materials or any lack of space to allow for expansion and contraction of the work during the Contractor's warranty period, from the date of final acceptance of the work by the Owner. The Contractor shall furnish a competent Massachusetts licensed superintendent satisfactory to the Owner Project Manager and to the Designer. The licensed superintendent shall supervise all work under this contract and who shall remain on duty at the site throughout the Contract period while work is in progress.
- B. The Contractor shall furnish a competent Massachusetts licensed superintendent satisfactory to the Awarding Authority and to the Designer. The licensed superintendent shall supervise all work under this contract and who shall remain on duty at the site throughout the Contract period while work is in progress.
 - 1. Submit the name and resume of the superintendent for approval to the Awarding Authority's Project Manager. Include experience with projects of equal size and complexity.

1.9 CONTRACTOR'S USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated within the Limit of Work shown on the site drawing(s). Coordinate work of all Subcontractors required outside the Limit of Work shown on the site drawing(s). Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated. School operations will be ongoing during construction and the contractor shall coordinate and schedule all work with the Owner to minimize any disruption to the business.
 - 1. Owner Occupancy: Allow for Owner occupancy as necessary.
 - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 3. Areas outside the Limit of Work or Immediate Work Area: The Contractor is responsible for clean-up of all debris, dirt and sediment resulting from the construction work.
- B. Schedule and perform work to afford minimum of interruption to normal and continuous operation of utility systems. The Contractor shall submit to the Owner and the Designer for approval, proposed schedule for performing work: including paving, earthwork, construction of new utilities and drainage and final connection of new work to existing work.
- C. The Contractor shall schedule as per Section 015000 - Temporary Facilities and Controls, the shutting down or interrupting any utilities, services or facilities which may affect the operation of the building outside the area of work or other buildings, services or facilities of the school.
- D. Coordinate with the Owner and the Designer work in connection with adjacent driveways, walks, or other facilities which would prevent access thereto or interrupt, restrict, or otherwise infringe upon the school's use thereof.
- E. The Contractor shall be aware of the sensitivity of the school to noise, dust, debris, vibration, and site maintenance and take appropriate precautions to avoid conflict.
- F. Damage to existing work, if caused by the Contractor's operations under this Contract, shall be repaired at the Contractor's expense.
 - 1. An existing conditions survey shall be conducted at which existing conditions will be videotaped by the Contractor. A copy of the videotape will be provided to the Owner Project Manager.
- G. Trenching and other work outside construction limits shall be expedited to the fullest extent and carried out with minimum of inconvenience to normal operation of the school and the public traffic. Walks, paved or landscaped areas over which temporary driveways cross, shall upon completion of the work, be restored to their original condition. Temporary roadways shall be bridged over trenched areas.
- H. The Contractor can gain access to the premises during the hours specified below. In addition, the Contractor and their personnel will limit themselves only within the working premises during working hours. If work needs to be scheduled during times other than those listed below, the Contractor shall inform the Owner Project Manager one week prior to work.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Deliveries: 9:00 AM to 4:30 PM
 2. General Access: 8:30 AM to 5:00 PM during the regular work week
- I. Confine operations at the site to areas permitted by:
1. Laws
 2. Ordinances
 3. Permits
 4. Contract Documents
 5. School Regulations
- J. If required by the Owner Project Manager, workers will be required to wear identifying name badges. In secure areas, submit names of workers for clearing by the Owner Project Manager.
- K. Contractor shall supervise the use of the site related to construction and be responsible for correcting any damage identified by the Owner Project Manager to the school's satisfaction.
- L. All available existing utilities adjacent to the construction site will be available for use during construction unless indicated otherwise. Temporary connections to these utilities, all metering, transformers, removal, usage, and their associated costs will be the responsibility of the appropriate Subcontractor.
- M. The Contractor shall verify that Subcontractors have visited the site and included all costs associated with the location of the project, and any restriction or limitations the location of the project may pose.
- N. The Subcontractors shall at all times conduct their operations in a courteous, professional manner while on the project or in the vicinity of the project. Harassment, offensive language or behavior will not be permitted on the site.
- O. The Dracut Public Schools can neither accept nor assume responsibility for the security of the Contractor's material or equipment which is lost, stolen or vandalized. The Contractor is advised to exert caution in placement and storage of their equipment and material.
- P. Parking: Parking spaces on school grounds are very limited and the school will not provide designated parking lot spaces near the construction site for the Contractor's use. The Contractor will be required to pay all fees for parking. The Contractor shall state his/her parking and staging area requirements during the Pre-construction Meeting. The area(s) for materials storage will then be agreed to between the Contractor and the Dracut Public Schools' Project Manager. The limits of material storage will be delineated by the Contractor with construction fencing and enforced throughout the Contract. Refer to Section 015000 - Temporary Facilities and Controls for additional requirements.
- Q. Areas not to be used for storage include the areas under the "drip line" of trees, planting beds, and sidewalks. Install temporary fencing around the drip line of trees and protect vegetation from construction damage. Restoration of the delineated parking and storage area shall be as described in Section 017700 – Contract Closeout. Trailers or storage piles shall not be located over utility lines or their access points.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- R. Radios, tape players, "boom boxes", or other audio entertainment equipment, including personal entertainment devices, shall not be allowed on the project site.
- S. The Dracut Public Schools prohibits tobacco use everywhere on campus, inside buildings and throughout the grounds. This policy applies to everyone and anyone on campus, including students, staff, faculty, contractors, and visitors. For the purpose of this policy, 'tobacco' refers to any and all tobacco products, whether inhaled or ingested, as well as electronic cigarettes.
 - 1. The use of tobacco is prohibited in all buildings and vehicles owned or leased by the Dracut Public Schools, regardless of location.
 - 2. The use of tobacco is prohibited on all school grounds and in any outdoor area controlled by the school. This includes all school land, parking lots and parking ramps, athletic fields and recreational areas.
 - 3. The use of tobacco is prohibited inside any vehicle located on school grounds.
 - 4. When any person enters the grounds of the Dracut Public Schools, any smoking material shall be extinguished and disposed of in an appropriate receptacle at the perimeter of the grounds of the school.
- T. The Contractor shall not allow the use of intoxicating beverages or non-prescription controlled substance drugs upon or about the work site.
- U. The Contractor shall provide and maintain in good serviceable condition at all times, warning signs and non-combustible barriers, forms and fire resistive tarps or plastic, each of which shall be approved by the Dracut Public Schools, shall be suitable for the purpose, and shall be installed adjacent to each work area, for complete enclosure and/or isolation of all excavations, wells, pits, manholes, shafts, overhead areas, etc., which are associated with the work under the contract. Barriers shall be a secure fence, guardrail, cover, or similar assembly designed and erected to provide protection for concrete, protection from the weather, and to prevent accidental access. Barrier tape and/or sawhorses shall not be used as a means of such access protection.

1.10 COORDINATION

- A. The Contractor shall be responsible for the proper fitting of all the work and for the coordination of the operations of all Subcontractors or material and persons engaged upon the work. The Contractor shall do, or cause his/her agents to do, all cutting, fitting, adjusting, and repair necessary in order to make the several parts of the work come together properly.
 - 1. Examine Contract Documents in advance of start of construction and identify in writing questions, irregularities or interference to the Owner Project Manager in writing. Failure to identify and address such issues in advance becomes the sole responsibility of the Contractor.
- B. Execute the work in an orderly and careful manner with due regard to the occupants of the facility, the public, the employees, and the normal function of the facility.
- C. The work sequence shall follow planning and schedule established by the Contractor as approved by the Designer and the Owner Project Manager. The work upon the site of the project shall commence promptly and be executed with full simultaneous progress. Work

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

operations which require the interruption of utilities, service, and access shall be scheduled so as to involve minimum disruption and inconvenience, and to be expedited so as to insure minimum duration of any periods of disruption or inconvenience.

- D. The Contractor shall review the tolerances established in the specifications for each type of work and as established by Subcontractor organizations. The Contractor shall coordinate the various Subcontractors and resolve any conflicts that may exist between Subcontractor tolerances without additional cost to the Owner. The Contractor shall provide any chipping, leveling, shoring or surveys to ensure that the various materials align as detailed by the Designer and as necessary for smooth transitions not noticeable in the finished work.

1.11 FIELD ENGINEERING

- A. Provide field engineering services; establish grades, lines and levels, by use of recognized engineering survey practices. All field engineering surveying shall be performed by a licensed Land Surveyor registered in the Commonwealth of Massachusetts.
- B. The Contractor shall survey and submit exact dimensional layouts as required. Engage and pay for the services of a Massachusetts Registered Surveyor acceptable to the Owner Project Manager to locate and protect control and reference points.

1.12 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements for the standard, except where more rigid requirements are specified or are required by codes. Refer to Section 014200 - REFERENCES.
- B. Where reference is made in the Contractual Documents to Publications and Standards issued by Associations or Societies, the intent shall be understood to specify the current edition of such Publications or Standards (including tentative revision) in effect on the date of the contract advertisement notwithstanding any reference to a particular date.

1.13 PRE-CONSTRUCTION CONFERENCE

- A. In accordance with Article V of the CONTRACT AND GENERAL CONDITIONS, a pre-construction conference to review the work will be conducted by the Owner Project Manager.
- B. Representatives of the following shall be required to attend this conference:
1. Dracut Public Schools
 2. Designer
 3. Contractor
 4. All Subcontractors
 5. Applicable Agencies
- C. The Contractor shall have a responsible representative at the pre-construction conference to be called by the Owner Project Manager following the award of the contract, as well as

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

representatives of field or office forces and major Subcontractors. All such representatives shall have authority to act for their respective firms. The pre-construction conference is to be held within five (5) days of a Letter of Intent, or as otherwise determined by the Owner.

D. Contact List: The Contractor shall provide to the Designer and Owner Project Manager a list containing the following:

1. Contractor's name, address, office and cell phone number, fax number, e-mail address and after-hours emergency phone number.
2. Contractor's Superintendent name email address and cell phone number.
3. Each Sub-Contractor's name, email address, address, office and cell phone number, fax number and description of the products or services they will provide to the project.

E. Agenda: Discuss items of significance that affect progress, including the following:

1. Tentative construction schedule.
2. Phasing.
3. Critical work sequencing.
4. Designation of responsible personnel. The Contractor shall identify a contractor safety representative to interface with the Owner. This person may also fill other roles within the Contractor's project area e.g., project manager, superintendent, foreman, etc.
5. Procedures for processing field decisions and Change Orders.
6. Procedures for processing Applications for Payment.
7. Distribution of the Contract Documents.
8. Submittal procedures.
9. Preparation of Record Documents.
10. Use of the premises.
11. Safety. The Dracut Public School Safety Officer will attend the pre-construction meeting for the purpose of orienting the Contractor to policies specific to the school, discuss the Contractor's site-specific safety plan, as well as to emphasize recognized safety practices expected on campus. The Contractor Safety Representative is responsible to ensuring this information is disseminated to all contractor/ subcontractor employees. If the Safety Officer is unable to attend, the Owner may send a designee to cover this portion of the meeting or the Owner Project Manager will schedule a separate time when this review may be completed.
12. Responsibility for temporary facilities and controls.
13. Parking and construction limits.
14. Office, work, and storage areas.
15. Equipment deliveries and priorities.
16. First aid.
17. Security.
18. Progress cleaning.
19. Working hours.
20. Emergency phone numbers.
21. Payment procedures and Schedule of Values.
22. Material deliveries.

F. Reporting: Minutes of the meeting shall be prepared by a designated owner's representative and shall be distributed to each party present. The Contractor shall be responsible for distributing the minutes to all Filed-Sub Contractor Form.

1.14 PROJECT MEETINGS

- A. Project meetings shall be held on a weekly basis and as required subject to the discretion of the Owner Project Manager.
- B. Attendees: In addition to the Owner Project Manager, and Designer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 2. Review present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Sequence of operations.
 - c. Status of submittals.
 - d. Deliveries.
 - e. Off-site fabrication.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and controls.
 - i. Manpower.
 - j. Hazards and risks.
 - k. Progress cleaning.
 - l. Quality and work standards.
 - m. Change Orders.
 - n. Documentation of information for payment requests.
- D. As a prerequisite for monthly payments, ordering schedules, shop drawing submitted schedules, and coordination meeting schedules shall be prepared and maintained by the Contractor and shall be revised and updated on a monthly basis, and a copy shall be submitted to the Owner Project Manager and Designer.
- E. In order to expedite construction progress on this project, the Contractor shall order all materials immediately after the approval of shop drawings and shall obtain a fixed date of delivery to the project site for all materials ordered which shall not impede or otherwise interfere with construction progress. The Contractor shall present a list and written proof of all materials and equipment ordered (through purchase orders). Such list shall be presented at the meetings and shall be continuously updated.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- F. Scheduling shall be discussed with all concerned parties, and methods shall be presented by the Contractor, which shall reflect construction completion not being deferred or foreshortened. Identify critical long-lead items and other special scheduling requirements. The project schedule is to include time for submission of shop drawing submittals, time for review, and allowance for resubmittal and review.
- G. Project meetings shall be chaired by the Owner Project Manager.
- H. Minutes of the project meetings shall be prepared by the owner's representative and shall be distributed to all present. The owner's meeting minutes shall be the only official meeting record. Minutes shall enumerate each topic item, and each topic shall be updated at each progress meeting. Actions to be taken for each topic shall be recorded, along with identification of the party responsible for each action item. Items shall not be removed from the Minutes until all issues with each item have been resolved.

1.15 PERMITS, INSPECTION, AND TESTING REQUIRED BY GOVERNING AUTHORITIES

- A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having any jurisdiction require any portion of the Work to be inspected, tested, or approved, the Contractor shall give the Designer, the Owner Project Manager or his/her designated representative, and such Authority timely notice (5 business days minimum) of its readiness so the Designer may observe such inspecting, testing, or approval.
- B. Prior to the start of construction, the Contractor shall complete application to the applicable Building Code enforcement authority for a Building Permit. Such Permit shall be displayed in a conspicuous location at the project site. The building permit fee shall be paid by the Contractor.
- C. Unless otherwise specified under the Sections of the Specifications, the Contractor shall pay such proper and legal fees to public officers and others as may be necessary for the due and faithful performance of the work and which may arise incidental to the fulfilling of this Contract. As such, all fees, charges, and assessments in connection with the above shall be paid by the Contractor.
- D. The Contractor shall maintain at the site, for the duration of construction operations, at least one (1) up-to-date copy of all relevant codes and standards listed in the Contract Documents or determined to be applicable to the work. One (1) copy of such codes shall be for the exclusive use of the Owner and the Designer and its Consultants and shall be kept in the Contractor's site office.
- E. The Contractor shall furnish and install all information required by the building official and shall secure the general building permit for the work promptly on award of the Contract. The Contractor shall conform to all conditions and requirements of the permit and code enforcement authority. The Contractor shall provide names and license numbers of its responsible representatives to complete the application for permit and shall receive the permit and promptly distribute copies to the Owner and the Designer.
- F. Contractor and specialized Subcontractors as applicable shall identify all permits (other than general building permit) required from Authorities having jurisdiction over the Project for the construction and occupancy of the work. The Contractor shall prepare the necessary

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

applications and submit required plans and documents to obtain such permits in a timely manner and shall furnish the required information to the Building Official and obtain the required permits as early as practicable after award of the Contract.

1. The Contractor shall display all permit cards as required by the Authorities and shall deliver legible photocopies of all permits to the Owner's Project Manager and the Designer promptly upon their receipt.
 2. The Contractor shall arrange for all inspections, testing and approvals required for all permits, and shall notify the Designer and the Owner's Resident Engineer of such inspections at least three (3) business days in advance (longer if so required in the various Sections of the Specifications), so they may arrange to observe.
 3. The Contractor shall comply with all conditions and provide all notices required by all permits.
 4. The Contractor shall perform and/or arrange for and pay all testing and inspections required by the Governing Codes and Authorities, other than those provided by the Owner, and shall notify the Designer and the Owner's Resident Engineer of such inspections at least three (3) business days in advance of all such testing or inspection, so they may arrange to observe.
 5. Where Inspecting Authorities require corrective work for conformance with applicable Codes and Authorities, the Contractor shall promptly comply with such requirements, except in cases where such requirements clearly exceed the requirements of the Contract Documents, in which case the Contractor shall proceed in accordance with the procedures for modifications or changes in the work established in the Contract Documents, as amended.
- G. Prior to the start of construction, the Contractor shall complete applicable applications, permits, and notifications to the and pay the required fees. Forms must be submitted at least 10 working days in advance of any regulated activity on the site. Demolition permits must be submitted for any work involving demolition, new construction and renovation. The Owner's Environmental Health and Safety office must be provided copies of any and all notifications.
- H. Building permits are required for the installation of office trailers. Trailers must be securely anchored to prevent displacement due to wind.
- I. Metal dumpsters of 6 cubic yard aggregate capacity or more, and containing combustible materials, must have a Local Fire Department Permit issued for each location. If the containers are delivered and removed on the same day, no permit is required (527 CMR 34.03).
- J. Storage of more than 2500 cubic feet gross volume of combustible or flammable materials in a building will require a permit from the Local Fire Department.
- K. Use and storage of more than 10 gal or 42 lbs of Liquefied Propane Gas (LPG) containers on site must be approved by and a permit must be secured through the local Fire Department.
- L. Any work involving existing fire protection systems or related equipment (fire alarm, sprinkler, fixed extinguishing system) will require the Contractor to obtain a permit from the local Fire Department. Any work that affects Fire Protection Systems shall require the Contractor to notify the Owner's Environmental Health and Safety Department. Any work which disables part or all of a fire protection system for more than 8 hours shall submit an impairment plan to the Owner Project Manager, and EH&S.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- M. The Contractor is required to obtain trenching permits for any excavations or trenches that are greater than 36 inches in depth three working days prior to start of work.
- N. The Contractor shall be required to keep a copy of the State Building Code (with latest amendments) at the job site at all times.
- O. Any construction sites disturbing greater than one acre require a notice of intent to the EPA and will require a written stormwater pollution prevention plan. A Notice of Termination must then be filed when sediment controls are no longer required.

1.16 CUTTING, CORING, AND PATCHING, UNLESS OTHERWISE INDICATED

- A. The Contractor shall coordinate all cutting, coring, fitting and patching of the work that may be required to make its several parts come together properly and fit it to receive or be received by work of the Subcontractors shown on the Drawings and Specifications. The Subcontractor shall perform all cutting, coring or patching.
- B. The Contractor shall coordinate that the work of the Subcontractor is not endangered by any cutting, coring, excavating, or otherwise altering of the work and shall not allow the cutting or altering the work of any Subcontractor except with the written consent of the Designer.
- C. Submit a written request to Designer at least three (3) business days in advance of executing any cutting or alteration which affects:
 - 1. Work of the Dracut Public School or separate Contractor.
 - 2. Structural value or integrity of any element of the Project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance, or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
 - 6. Request shall include:
 - a. Identification of the Project.
 - b. Description of affected work.
 - c. The necessity for cutting, alteration, or excavation.
 - d. Effect on work of the school, or any separate Contractor, or on structural or weatherproof integrity of Project.
 - e. Description of proposed work:
 - f. Alternatives to cutting and patching.
 - g. Cost proposal, when applicable.
 - h. Written permission of any separate Contractor whose work will be affected.
 - 7. Should conditions of Work or the schedule indicate a change of products from original installation, Contractor shall submit request for substitution.
 - 8. Submit written notice to Designer designating date and time the work will be uncovered a minimum of three business days in advance.
- D. Performance:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Execute cutting and patching by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
 - a. In general, where mechanical cutting is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.
 - b. Comply with the requirements of Section 312000 - EARTH MOVING where cutting-and-patching requires excavating and backfilling.
 - c. Prior to cutting and structural steel or concrete work, contact Designer in writing. Do not cut any structural steel and concrete work until approval has been granted by the Designer.
 2. Employ original installer or fabricator to perform cutting and patching for:
 - a. Weather-exposed or moisture-resistant elements.
 - b. Sight-exposed finished surfaces.
 3. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
 4. Restore work which has been cut or removed; install new products matching existing to provide completed Work in accordance with requirements of Contract Documents.
 5. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 6. Patch with seams which are durable and as invisible as possible. Flash and seal all penetration of exterior work. Comply with specified tolerances for the work.
 7. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.
 - a. Where patch occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch.
 8. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - a. For continuous surfaces, refinish to nearest intersection.
 - b. For an assembly, refinish entire unit.
- E. Existing Utilities Services:
1. Interruptions to critical existing utility services will not be allowed except as scheduled per Section 015000 - Temporary Facilities and Controls.
 - a. Sanitary sewer, storm drainage, and water changeovers as affecting existing services shall be done with no disruptions of existing services and scheduling of such work will require approval in writing by the Owner.
 - b. All relocation of existing electrical, telephone, and gas services that are utility company owned shall be performed by the respective utility company, and the cost of any charges for such work shall be paid by the Contractor. All utility installations and relocation shall be the responsibility of the Contractor. Coordination of all of the aforesaid work is the responsibility of the Contractor.
 2. The Contractor shall locate and record on Drawings all existing utilities along the course of the work by such means as the Designer and the Owner Project Manager may approve

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

and shall preserve such marked locations until the work has progressed to the point where the encountered utility is fully exposed and protected as required. It shall be the Contractor's responsibility to notify the proper authorities and/or utility company before interfering therewith.

3. Existing utilities that are indicated on the Drawings or whose locations are made known to the Contractor prior to excavations, though accuracy and information as to grades and elevations may be lacking, shall be protected from damage during the excavation and backfilling operations and, if damaged by the Contractor, it shall be repaired by the Contractor at his/her own expense.
4. All exposed conduits, wires, and/or cables shall be provided with sufficient protection and support to prevent failure, fraying, or damage due to backfilling or other construction operations.
5. The Contractor shall not obstruct access to existing active utility system manholes and catch basins which continue to serve facilities other than the project construction site. The Contractor shall exercise measures as necessary to prevent the placement of impediments that limit continuous access by authorized utility company or the Owner's maintenance personnel and shall be required to reimburse the utility company or the Owner for any expense incurred as a result of need to remove any such impediments to access.

F. Dig-Safe:

1. If excavation, staking or any other scarifying existing grade to a depth greater than 6 inches is required, the Contractor shall follow the standard DIG-SAFE procedures as described in Massachusetts General Laws (CMMR 82: Section 40). Contractor shall review the following procedures with the Owner Project Manager prior to initiating DIG-SAFE procedures to ensure that there have not been changes.
2. The Contractor shall pre-mark all areas to the full extent of proposed excavation(s) with white paint. Use fluorescent pink paint when snow cover is present. Maintain complete visibility of paint for entire DIG-SAFE period.
3. After marking the site, apply for a DIG-SAFE permit.
4. After marking the site, and at least seven (7) days before an excavation, the Contractor shall notify DIG-SAFE by calling 811 or online at <http://www.digsafe.com>.
5. If the Contractor is informed of issues regarding the proposed excavation, the Contractor shall resolve those issues to the satisfaction of the Owner and Designer. Issues that may require changes in the project design shall be brought to the attention of the Designer and Owner Project Manager immediately for resolution. If no issues are raised by the DIG-SAFE Coordinator that require the design of the project to change, the Contractor may proceed with the proposed excavation(s) commencing seven (7) working days after submission of the site plan and Quick-Ticket Number to the DIG-SAFE Coordinator.
6. Prior to the "Dig-Safe" notification, the Owner requires Contractors to provide their Superintendent with current "Dig-Safe" regulations, and a copy of Massachusetts General Laws, Chapter 82, Section 40.

1.17 DEBRIS REMOVAL

- A. The Contractor shall coordinate the removal of all demolition and construction waste by the Subcontractor from the job site on a daily basis. Waste shall be segregated for recycling. Debris shall be legally disposed of in a D.E.P. approved disposal site. The site to be used shall

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

be submitted to and approved by the Owner Project Manager prior to the start of construction. All required dumping permits shall be obtained prior to start of construction. Contractor shall submit receipts from the disposal site(s) as evidence of legal disposal. The Subcontractor shall pay the cost of any charges for debris removal.

- B. The Contractor shall bear responsibility for maintaining the building and site clean and free of debris, leaving all work in clean and proper condition satisfactory to the Owner and the Designer. The Contractor shall ensure that each of the Subcontractors clean up during and immediately upon completion of their work. Clean up includes the following tasks:
 - 1. Remove all rubbish, waste, tools, equipment, appurtenances caused by and used in the execution of work.
 - C. Prevent the accumulation of debris at the construction site, storage areas, parking areas, and along access roads and haul routes.
 - D. Provide containers for deposit of debris and schedule periodic collection and disposal of debris.
 - E. Prohibit overloading of trucks to prevent spillage on access and haul routes.
 - F. The Contractor shall be responsible for proper disposal of all construction debris leaving the site.

1.18 FIELD MEASUREMENTS

- A. Although care has been taken to ensure their accuracy, the dimensions shown for existing items and structures are not guaranteed. It is the responsibility of the Contractor to verify these dimensions in the field before fabricating any construction component. No claims for extra payment due to incorrect dimensions will be considered by the Owner.

1.19 EMERGENCY PROCEDURES

- A. The Contractor shall thoroughly familiarize himself/herself with Emergency Procedures and inform all subcontractors of same. Note that on school grounds:
- B. Emergencies: In the event of an emergency on-site, telephone for emergency services (ambulance, fire department or police assistance)
- C. Call 911.
- D. Make the scene safe.
- E. Render First-Aid if possible.
- F. Preserve evidence.
- G. Call the Owner Project Manager.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- H. Call the Owner Project Manager and EH&S for significant incidents/injuries beyond first aid, including situations that have the potential to cause significant personal injury or damage to school property. All spills of hazardous materials regardless of quantity shall be reported to EH&S. The Owner's EHS office is responsible for notifying MADEP if appropriate, and any necessary outside responders, unless the Contractor has specified their own responder.
- I. Contact the appropriate outside agencies as required by law, including OSHA for fatalities or injuries requiring hospitalization of three or more individuals (by Contractor). All regulatory notifications required for environmental events shall be made by the Owner's EH&S. Contractors shall report any incident involving a radiographic source to the Owner's EH&S, the Mass Dept of Public Health (DPH) and The US Nuclear Regulatory Commission (NRC). Ensure the Owner's and Designer's office is contacted as well for any of these circumstances.

1.20 SAFETY REGULATIONS

- A. This project is subject to compliance with Public Law 91 596 "Occupational Safety and Health Act" latest edition (OSHA 29 CFR 1926), with respect to all rules and regulations pertaining to construction, including Volume 36, numbers 75 and 105, of the Federal Register, as amended, and as published by the U.S. Department of Labor.
- B. Submit the name of the Contractor's safety officer to the Owner Project Manager. Submit copies of safety reports to the Owner Project Manager monthly.
- C. Each Contractor/ subcontractor will be responsible to submit a written Safety Program, prior to starting construction, outlining measures they take to cover their operations and protect their employees. Construction Projects will also submit a Site-Specific Safety Plan specific to their operations at the school and which address their plan of action for identified and potential environmental, health and safety issues that may arise prior to start of construction. Maintain a written hazard communication program in accordance with OSHA 29CFR 1910.1200. Keep MATERIAL SAFETY DATA SHEETS (MSDS) on site and upon request provide MSDS sheets for materials used in the construction.
- D. All accident reports are to be transmitted to the Resident Engineer within 24 hours of occurrence.
- E. The Contractor shall immediately notify the Owner and Designer if an OSHA, DEP or EPA regulator visits the site.
- F. The Owner and Designer personnel shall have the authority to exercise on-site compliance audits on the construction site. Deficiencies discovered during site inspections and visits will be relayed to the Contractor's company safety representative and the Owner Project Manager. The Contractor will communicate back to the Owner Project Manager and Environmental Health and Safety on the course of corrective action to be taken and the timeline for completion. If during such an audit, in his or her professional opinion, there exists an imminent danger or serious violation of established environment, health and safety standards that could lead to death or serious physical harm, damage to school property or the environment, the Owner's representative has the right to request the immediate halt of such operations.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- G. Hazardous Waste Generation: Any work generating Hazardous or so-called Universal Wastes will comply with all requirements of 310 CMR 30.000. The proper storage, use and disposal of any hazardous chemicals or substances brought on site by the Contractor are the responsibility of Contractor. The Owner will not be responsible for any hazardous materials left on site, the cost to remove these materials will be the Contractor's responsibility. All hazardous wastes generated as a result of demolition and remodeling shall be contained, collected, segregated, labeled per all applicable federal EPA, Massachusetts DEP, and Federal DOT regulations or other applicable local, state or federal hazardous waste regulations, pending the appropriate disposition. Contractor shall provide for properly packaging hazardous waste, preparing the proper shipping papers, identifying a permitted disposal site, and contacting EH&S at least 24 hours prior to shipment of the waste. EH&S will review the hazardous waste shipment and sign the paperwork. EH&S must keep the "Generator" copies of the manifest on file in the EH&S office.
- H. The Contractor must inform Town officials if they intend to store any type of oil in 55 gallons or larger quantities so that such storage can be included in the Owner's SPCC plan, this includes oil for equipment, form oil, cutting oil, diesel, gasoline, etc. Spills of any oil outside to soil, water or ambient air shall be reported to Town officials. Oil is also considered to be a hazardous waste in the state of MA when it is disposed. All waste oil must be managed in accordance with the hazardous waste section of this document.
- I. Non-Destructive Testing: The Contractor shall notify the Owner Project Manager and Town officials three (3) days prior to the use of a radiography or x-ray equipment. The Contractor shall demonstrate safety procedures acceptable to the Owner and also provide sufficient personnel to maintain the safety zone perimeter as required by code. Dracut must be contacted to review all radiography to be performed on campus property before it takes place. In the event of a failed source, it is the Contractor's responsibility to recover a damaged radiography source, moisture density gauge or other radioactive source used in the construction industry and to decontaminate any soil, equipment or other school property contaminated by a failed source.
- J. Any salamanders used must exhibit an approval tag from the Massachusetts State Fire Marshal and any Contractor intending to utilize a salamander shall meet the requirements of 527CMR 20 and obtain a permit from the local Fire Department.
- K. All Hot Works, including cutting, welding, brazing, etc., requires a permit from Town officials. A Hot Works permit is not required for work performed outside (unless it is in a temporary enclosure such as a tent). Contractor must provide a minimum of one operable fire extinguisher approved by a recognized testing laboratory and rated for the intended purpose near each Hot Work operation. At least one employee of the Contractor shall remain on the site for one hour after the hot work has ceased to ensure against the outbreak of fire.
- L. Use of Liquefied Propane Gas (LPG) and containers on site must be approved by and a permit must be secured through the local Fire Department.
 1. Conformance to State Fire Prevention Regulations 527 CMR 6 and National Fire Protection Association standard on LPG: NFPA 58 1998.
 2. Contractor must provide a minimum of one operable 20 BC rated fire extinguisher approved by a recognized testing laboratory near each LPG operation.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- M. Use of torches or other flame producing devices for the removal of paint from buildings, or the application or removal of roofing materials must conform with the State Fire Marshal's regulations (527 CMR 10.24).
1. Permit must be secured through the local Fire Department.
 2. An approved and operable fire extinguisher must be kept in the work area
 3. At least one (1) workman must remain at the work area for (1) hour after the use of the torch or flame producing device has ceased.
- N. Contractor performing work in buildings that will cause smoke or dust particles to become airborne must first check for the existence and location of heat or smoke detectors and other types of fire protection system equipment which may be affected by the work. The Contractor shall request isolation or deactivation of such equipment through the Owner Project Manager. Such isolation, deactivation and notification shall occur prior to commencing work. Upon completion of the work, the Contractor shall request reactivation of such equipment through the Project Manager. The Owner may require that smoke detectors be bagged on a daily basis if smoke or dust particles may affect them. In this event bags must be removed at the end of the day. Notify the Owner, Environmental Health and Safety Fire Prevention officer prior to isolation or deactivation of such equipment.
- O. All construction will comply strictly with the Massachusetts State Building Code Article 30 (780 CMR 30): Required fencing, sidewalk sheds, storage of flammables, portable fire extinguishers, fire standpipe operation and rubbish removal will be enforced by Environmental Health & Safety.
- P. Confined Space Requirements:
1. Permit Required Confined Spaces, (PRCS). If work under this Contract specifically or incidentally requires this Contractor or any of his Sub-Contractors to enter spaces that are meeting the definition provided in 29 CFR 1926 Subpart AA (1926.1200-1926.1213) of a "Permit Required Confined Spaces", it shall be the responsibility of the Contractor entering the space to have in place a Permit Required Confined Space Entry Program that meets OSHA 29CFR 29 CFR 1926 Subpart AA (1926.1200-1926.1213) requirements. No entry shall be made without the permit. The school requires that confined spaces encountered in construction projects be evaluated and entered in accordance with 29 CFR 1926 Subpart AA (1926.1200-1926.1213) UMA will provide information known about the space to the controlling contractor per 1926.1203(h). No entry will be made into a UMA Utility Manhole without first coordinating with the applicable UMA Utility Department.
 2. It is also the responsibility that any work performed under this contract in PRCS's be performed in strict compliance with the contractor's own PRCS/OSHA Policy.
 3. At the conclusion of any work in a PRCS, the Contractor shall debrief the Project Manager and provide copies of the documentation required under the Contractor's PRCS Policy.
 4. Emergency Response\ rescue - All emergencies are to be reported in order to 1) 911 Emergency Services 2) the Dracut Police at (978) 957-2123 and 3) the Owner administering the contract.
- Q. Contractors intending to use a device labeled as a CLASS 3 or 4 laser, in the services required under the contract, shall notify the Owner's Representative at least two (2) working days prior

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

to the intended date of use. Utilization of such a device shall meet the Commonwealth of Massachusetts Regulations, under 105 CMR 121.000, entitled RULES AND REGULATIONS RELATIVE TO THE USE OF LASER SYSTEMS, DEVICES OR EQUIPMENT TO CONTROL THE HAZARD OF LASER RAYS OR BEAMS.

- R. Prior to entry for review or work, in any areas storing or using radioactive material, the Contractor shall submit a written request for clearance, to the Owner's Division of Environmental Health and Safety (E.H.& S.) and the Owner's Representative. No work shall be performed in such areas until a "Radiation Area Job Permit" has been approved, signed, and issued to the Contractor, by an official of E.H.& S. Such areas have the appropriate signs and labels posted at each entrance.

1.21 OSHA SAFETY AND HEALTH COURSE DOCUMENTATION

- A. OSHA Safety and Health Course Documentation Records: Chapter 306 of the Massachusetts Acts of 2004 requires that everyone employed at the jobsite must complete a minimum 10-hour long course in construction safety and health approved by the U.S. Occupational Safety and Health Administration (OSHA) prior to working at the jobsite. Compliance is required of Contractors' and Subcontractors' on-site employees at all levels whether stationed in the trailer or working in the field. Unless the Massachusetts Attorney General's office indicates otherwise, this requirement does not apply to home-office employees visiting the site or to suppliers' employees who are making deliveries.
- B. Documentation records shall be initially compiled by the Contractor and Subcontractors as part of their certified payrolls, and the Contractor shall create and maintain a copy of the documentation on site at all times. On-site documentation shall be filed in alphabetical order and immediately available to the Owner, Designer and OSHA inspectors. Fines imposed for non-compliance shall be promptly paid by the Contractor at no additional expense to the Owner. Delays in the progress of the Work caused by such non-compliance will not be acceptable as the basis for an extension of contract time or change order request.

1.22 DAMAGE RESPONSIBILITY

- A. The Contractor shall repair, at no cost to the Owner, any damage to building elements, site appurtenances, landscaping, utilities, etc. caused during demolition operation and work of this Contract.

1.23 SCHOOL OCCUPANCY

- A. Beneficial Use and Occupancy: Refer to requirements in Section 017700 - CONTRACT CLOSEOUT, Par. 1.6.
- B. Use and Occupancy: When the project is Substantially Complete (with all work affecting health, safety, and function totally completed, and with less than one percent (<1%) of the contract value remaining) and ready for Use and Occupancy as determined by the Designer, the Owner Project Manager and the Operating Agency, then the Owner will take control of their building area(s) and be responsible for operating costs and security.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1.24 ASBESTOS AND HAZARDOUS MATERIALS DISCOVERY

- A. If unanticipated asbestos-containing materials or other Hazardous Materials not included in the Contract are discovered at any time during the course of work, the Contractor shall cease work in the affected areas only and continue work in other areas, at the same time notify the Owner and the Designer of such discovery. Do not proceed with work in such affected areas until written instructions are received. If removal is required, payment will be made in accordance with the contract unit prices bid for each respective material. In the absence of unit prices, costs shall be negotiated or otherwise established prior to commencement of removal, in accordance with provisions of the Contract.
- B. The Owner and Designer will work with the Contractor to initiate removal or encapsulation of the asbestos. An extension of the completion date may be granted equal to the time lost. Proper notification must be made to the MADEP through the ANF-001 form, and the Owner.

1.25 SPECIAL REQUIREMENTS

- A. The Contractor shall prepare a Health and Safety Plan that addresses protection of employee and public health and safety. The minimum contents of the Plan are specified in Section 013300 – SUBMITTAL REQUIREMENTS.
- B. The Contractor shall be solely responsible for implementing the procedures specified in the Plan.
- C. The Contractor shall make available complete sets of personal protective equipment and clothing to the Owner for use during site observations/inspections by the Owner and the Designer. These shall be supplied and maintained at no cost to the Owner and the Designer, and shall be returned to the Contractor upon the completion of work, except for disposable protective clothing.
 - 1. The Contractor shall provide a repository for collection and disposal of health and safety materials. Collection and disposal of contaminated disposable supplies shall be at no additional cost.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 011200
CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. Cash allowances
- B. Contingency allowance
- C. Inspecting and testing allowances
- D. Schedule of values
- E. Application for payment
- F. Change procedures
- G. Measurement and payment – unit prices
- H. Alternatives

1.2 RELATED SECTIONS

- A. Not used

1.3 CASH ALLOWANCES

- A. Refer to other specifications sections for stated Allowance to be applied to the periodic, ‘as needed’ services of a licensed arborist.

1.4 CONTINGENCY ALLOWANCE

- A. Not Used

1.5 INSPECTING AND TESTING ALLOWANCE

- A. Not used

1.6 SCHEDULE OF VALUES

- A. Submit a printed, itemized schedule of values for all bid items of the work. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 10 days after date of Owner-Contractor Agreement established in Notice to Proceed.

- C. Format: Use the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section.
- D. Include in each line item, the value of Allowances specified in this section, if applicable.
- E. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment as applicable.

1.7 APPLICATIONS FOR PAYMENT

- A. Submit three (3) copies of each application on Contractor's electronic media driven form or an expanded version of the bid schedule. If submitted electronically, via email or using a project management software, one (1) copy of each application shall be submitted.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Payment Period: 30-days from approval of request for payment.
- D. Include any forms required by Owner.
- E. Include an updated construction progress schedule with each monthly application for payment.

1.8 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by the General Conditions.
- B. The Engineer may issue a Change Order which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period during which the requested price will be considered valid. Contractor will prepare and submit an estimate within seven (7) days.
- C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with the General Conditions of the Contract.

- D. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Work Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- E. Work Change Directive: Engineer may issue a Work Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.
- F. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.
- G. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- H. Refer to Section B – Contract Documents for Change Order Form and Work Change Directive Form.
- I. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.9 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

1.10 MEASUREMENT AND PAYMENT - UNIT PRICES

- A. Authority: Measurement methods are delineated in the individual specification sections.
- B. Take measurements and compute quantities. The Engineer will verify measurements and quantities proposed by the Contractor, or the Engineer will take measurements and compute quantities accordingly. Provide and assist in the taking of measurements.
- C. Unit Quantities: Quantities and measurements indicated in the Bid Form are for bidding purposes only. Actual quantities provided shall determine payment.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. Payment Includes: Full compensation for required labor (including sales tax), products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.11 ALTERNATIVES

- A. Not Used

- END OF SECTION -

SECTION 011300
ADMINISTRATION OF WORK

PART 1 – GENERAL

1.1 CONTRACT DOCUMENTS

- A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

1.2 COORDINATION

- A. The Contractor shall coordinate his operations with those of other contractors. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the work. The Contractor, including his subcontractors, shall keep informed of the progress and the detail work of other contractors and shall notify the Engineer immediately of lack of progress or defective workmanship on the part of other contractors. Failure of a Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him of the status of the work as being satisfactory for proper coordination with his work.
- B. The Contractor shall prepare a project schedule for approval by the Engineer and the Owner as outlined in Section 013300, SUBMITTALS. The approved progress schedule shall be followed in the execution of the work, but the Owner reserves the right to modify the schedule at any time after its approval subject to the Conditions of the Contract. If more than one prime contractor is involved, the General Contractor shall revise the master schedule and the procedures outlined in the preceding paragraph shall be followed to the extent necessary to produce a revised master schedule. All other prime contractors shall provide him with timely data for that purpose. If any contractor fails to maintain progress as originally scheduled, his input to the master schedule shall include adjustments to maintain progress and not delay the other prime contractors' original schedule during the remaining months.
- C. The Contractor shall keep a neatly marked-up copy of the approved progress schedule at the project site, showing the current status of completion of the various work items. The Contractor shall also keep a neatly marked-up set of As-Built Drawings at the project site showing construction currently installed.
- D. The Contractor shall plan his operations so that the operation and maintenance of existing facilities, including traffic and any electric, gas, water, sewer or drain utilities, are

sustained. Any proposed interruption by the Contractor of the operation and maintenance of such facilities must receive the prior approval of the Owner or other agencies, public or private, having jurisdiction over such facilities.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. The Contractor shall not commence work until a pre-construction conference has been held. The pre-construction conference will be arranged by the Engineer.
- B. In attendance shall be:
 - 1. Owner
 - 2. Engineer
 - 3. Contractor
 - 4. Representatives of utilities or entities as determined by Owner, Engineer and Contractor
- C. The minimum agenda will consist of the following:
 - 1. Introduction
 - 2. Designation of responsible personnel from Town, Contractor, Engineer, and representatives of utilities or entities determined by Owner, Engineer and Contractor
 - 3. Requirements of Town Departments and other organizations
 - 4. Relationships and coordination with utilities or entities and/or work
 - 5. Distribute and discuss the tentative construction schedule
 - 6. Critical work sequencing
 - 7. Major material deliveries and priorities
 - 8. Pre-Construction Documentation
 - 9. Survey
 - 10. Staking of work
 - 11. Submittal of shop drawings, project data and samples
 - 12. RFI procedures
 - 13. Processing of field decisions and change orders
 - 14. Procedure for maintaining record documents
 - 15. Complete time for contract and liquidated damages
 - 16. Requests for extension of contract time
 - 17. Procedures for making partial payments
 - 18. Guarantee on completed work
 - 19. Equipment to be used
 - 20. Project inspection
 - 21. Testing laboratory services
 - 22. Location of project offices
 - 23. Storage of equipment and materials on site
 - 24. Rights-of-way and easements, and work outside of these

- 25. Traffic control plan
- 26. Emergency vehicle access
- 27. Security procedures
- 28. Safety and first aid procedures
- 29. Emergency phone numbers
- 30. Labor requirements
- 31. Hours of work
- 32. Public outreach

1.4 JOB SITE ADMINISTRATION

- A. The Contractor shall keep a competent and authorized supervisory representative at each work location during all working hours whether work is being performed by the General or Subcontractor, who shall act as the agent of the Contractor.
- B. The supervisory representative on the contract work shall be a competent English-speaking superintendent capable of reading and thoroughly understanding the drawings and specifications, with full authority to promptly fulfill the Contractor's duties and responsibilities on the job. The Contractor's supervisory representative shall be subject to the approval of the Owner. The supervisory representative shall not be removed from the work without prior written consent of the Owner. If in the opinion of the Owner the supervisory representative or any of his successors proves incompetent, not conscientious, or not industrious, then the Contractor shall replace him with another person approved by the Owner. Approval by the Owner shall not, in any way, relieve or diminish the Contractor's responsibility for supervision of the work.
- C. The Contractor shall only employ competent workmen on the job. Whenever the Engineer or the Owner's Representative notify the Contractor in writing that, in their opinion, any workmen on the job, whether employed by the Contractor or any of his subcontractors, is incompetent, unfaithful, disorderly, or otherwise unsatisfactory, such workmen shall be discharged from the contract work and shall not be employed on it, except with the written consent of the Engineer and Owner's Representative. Plumbers and electricians shall be licensed as required by local and state authorities.

1.5 PROGRESS MEETINGS

- A. Weekly progress meetings shall be held. In attendance shall be a person in responsible charge representing the Contractor, representative of the Owner, resident inspector, Engineer and representative of utilities or entities listed in Specification Section 013100, Coordination, as needed.
- B. Suggested agenda:
 1. Review of work progression since previous meeting.
 2. Filed obstructions, problems, conflicts.

3. Review of delivery schedules.
 4. Revision to construction schedules.
 5. Coordination of schedules.
 6. Review of construction procedures proposed for upcoming elements of work.
 7. Traffic control plan
- C. The Contractor will be required to submit a construction schedule monthly at the same time the construction pay estimate is submitted. One of the weekly meetings will be used as the monthly partial payment request and monthly schedule update.
- D. If in the opinion of the Engineer, the Contractor is not maintaining his progress in accordance with the proposed construction schedule he will be required to make an extra effort to provide the additional resources necessary to adhere to his proposed schedule.

1.6 FIELD ENGINEERING

- A. The CONTRACTOR shall be responsible for laying out and constructing the work to the lines and grades indicated and specified. The CONTRACTOR shall be responsible for complete, timely, and accurate field measurements as necessary for proper coordination, fabrication, and installation of his materials and equipment. All layout and survey work shall be done by a competent agent or employee of the CONTRACTOR and shall be subject to the approval of the ENGINEER.

1.7 SAFETY

- A. The CONTRACTOR (and the subcontractors) shall be required to comply with all applicable federal, state and local regulations, codes, rules, laws, and ordinances and shall, at all times, exercise reasonable precautions for the safety of all persons. All rules, regulations and laws concerning safety that are in effect at the work site and in particular, all applicable regulations of the Occupational Safety and Health Administration of the U.S. Government, in addition to all the requirements of these Specifications, shall be complied with in all respects.
- B. The CONTRACTOR shall provide adequate equipment and facilities as are necessary and required for first aid service to any person who may be injured in the prosecution of the work under this Contract whether they are his own personnel, his subcontractor's personnel, the OWNER'S representative, or other persons who may for any reason enter within the limits of the contract work. The CONTRACTOR shall have standing arrangements for removal and hospital treatment of any person who may be injured.
- C. When construction permits are accompanied by regulations or requirements issued by a particular authority or agency, it shall be the CONTRACTOR'S responsibility to familiarize himself with and comply with such regulations or requirements as they apply to his operations on this project.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. The CONTRACTOR agrees to indemnify and hold the OWNER and ENGINEER harmless for, of, and from any loss including but not limited to fines, legal fees, penalties, and corrective measures that the CONTRACTOR, OWNER, or ENGINEER may sustain by reason of the CONTRACTOR'S failure to provide a safe workplace or to comply with all laws, rules and regulations in connection with the performance of this Contract.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 012900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Application for Payment Form to be used by the Contractor shall be submitted for approval to the Engineer at least ten (10) days prior to first payment application.
- B. For each item, by specification section number and title, provide a column for the following:
 - 1. Preparation of applications.
 - 2. Submission procedure.
 - 3. Direct payments by Owner.
- C. For specification sections covering more than one work item, list each item separately as a sub-listing to the section.
- D. The Contractor shall submit a schedule of values at the Pre-Construction Conference which shall provide the basis for progress payments once approved.
- E. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 PREPARATION OF APPLICATIONS

- A. Application shall be reviewed with the Engineer.
- B. Required information shall be type-written. Application shall be signed in ink by an authorized representative of the Contractor.
- C. Executed payment applications shall be submitted to the Engineer for review approval. Each application for payment shall be consistent with previous applications and payments made by the Owner.
- D. Provide dollar values in each column for each line item for portion of work performed and for stored materials.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount on the same as for an original item of work.

1.4 SUBMISSION PROCEDURE

- A. Submit six (6) copies of each application for payment on a monthly basis at times to be established at the Pre-Construction Conference. Applications for payment submitted more frequently than on a monthly basis will not be considered.
- B. The Engineer may require or request substantiating information. The Contractor shall submit data justifying line item amounts in question.

1.5 DIRECT PAYMENTS BY OWNER

- A. Upon receipt of a written claim, the Owner has the right to pay directly costs incurred in the performance of this Contract, which the Contractor has failed to pay.

PART 2 - PRODUCTS (Not Used)

PART 3 - PRODUCTS (Not Used)

END OF SECTION

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Project coordination:

1. Without limitations, coordination will include Critical Path Method Scheduling (CPM), coordination of submittals, coordination of all elements of the Work, and coordination of contract closeout.

- B. Description:

1. Coordinate scheduling, submittals, and work of the various Subcontractors and elements of the Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
2. Coordinate sequence of the Work to accommodate Partial (Beneficial) Occupancy.

- C. Meetings:

1. In addition to progress meetings, Contractor shall hold coordination meetings and pre-installation conferences with personnel and Subcontractors to assure coordination of the Work.

- D. Coordination of Submittals:

1. Schedule and coordinate submittals.
2. Coordinate work of various Subcontractors having interdependent responsibilities for installing, connecting to, and placing in service such equipment.
3. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effect on work of other Subcontractors.

- E. Mechanical and Electrical Coordination

1. Coordinate all activities associated with the work of the Testing Agency.

1.3 RELATED REQUIREMENTS

- A. Section 013300 - SUBMITTAL PROCEDURES.

B. Section 017700 - CLOSEOUT PROCEDURES.

1.4 GENERAL PROJECT COORDINATION

- A. Coordination: The Contractor is fully responsible for coordinating the Work of this Contract including scheduling, submittals, Work and other activities included in various Sections to assure efficient and orderly sequence of installation of interdependent construction elements. The Contractor is responsible for coordinating actual installed location and interface of work, and to make provisions to accommodate items scheduled for later installation.
- B. Where installation of one component depends on installation of other components before or after its own installation, schedule activities in the sequence required to obtain efficient installation with the least amount of alterations, or cutting and patching, to completed Work.
 - 1. The Contractor shall be responsible to uncover work completed in order to install ill-timed work, at no additional cost to the Owner.
- C. Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.
- D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of the school's activities.

1.5 UTILITIES, MECHANICAL AND ELECTRICAL COORDINATION

- A. Coordinate all Work of this Project. Provide full and complete coordination for utility work in Division 26 with Work of other Divisions.
- B. Give all advance notice to public utility companies as required by law, and provide proper disposition, subject to Designer's approval of all existing pipe lines, conduits, sewers, drains, poles, wiring, and other utilities that in any way interfere with the Work, whether or not they are specifically shown on the Drawings.

C. Coordination regarding existing utilities:

1. Notify Owner and Designer and appropriate authorities when coming across an unknown utility line(s) and await decision as to how to dispose of same.
2. When an existing utility line must be cut and plugged or capped, moved, or relocated, or has become damaged, notify Resident Engineer, Owner and Utility company involved, and assure the protection, support, or moving of utilities to adjust them to the new work.
3. The Contractor shall be responsible for all damage caused to existing, active utilities located within the limits of this Contract, whether or not such utilities are shown on the Drawings, including resultant damages or injuries to persons or properties.

D. General coordination of piping, ductwork, conduits and equipment:

1. The Contract Drawings are diagrammatic only intending to show general runs and general locations of piping, ductwork, equipment and sprinkler heads. Determine exact routing and location of individual systems prior to fabrication of components or installation.
 - a. Piping runs requiring pitch have “right-of-way” over those systems that do not pitch.
 - b. System components whose elevations cannot be changed have “right-of-way” over those components whose elevations can be changed.
 2. Adjust locations of piping, ductwork, conduits and equipment as required to accommodate new work with interferences anticipated and as encountered during installation.
 - a. Locate piping, conduits and ductwork to be clear of swinging doors, access doors, and clear for unimpeded equipment access.
 3. Provide all offsets, transitions and changes of direction for all systems, as may be required to maintain proper clearances for headroom, and as may be required for coordination with other “fixed-in-place” building components (such as structural systems).
 - a. Furnish all vents, drains and similar accessories as may be required for offsets, transitions and changes of direction.
 4. Provide openings in the work for penetration of mechanical and electrical work.
 5. Coordinate final locations of ceiling mounted devices (including air distribution devices, thermostats, heaters, control devices, sprinkler heads and similar work) with reflected ceiling plans. Review locations with Designer and obtain approval of all devices prior to installation.
- E. Utility penetrations through rated construction: Notify Designer of all locations of every penetration in fire resistant rated partitions and walls, in smoke barriers, and in fire barriers, including but not limited to penetrations for elevators, plumbing, fire suppression, heating, ventilating and air conditioning, electrical systems, telephone systems, communications

systems, building controls systems, and specialized wiring and piping for medical equipment.

- a. Provide removable (temporary) firestopping to maintain fire integrity until permanent firestopping assemblies can be installed.
2. Allow for inspection prior to installation of suspended ceilings or concealed by other materials that may conceal firestopping work.

1.6 COORDINATION DOCUMENTS

- A. General: Prepare coordination drawings for areas where close coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space necessitates maximum utilization of space for efficient installation of different components.
1. Coordination Drawings include, but are not necessarily limited to:
 - a. Structure.
 - b. Partition/room layout.
 - c. Ceiling layout and heights.
 - d. Light fixtures.
 - e. Access panels.
 - f. Sheet metal, heating coils, boxes, grilles, diffusers, and similar items.
 - g. All heating piping and valves.
 - h. Smoke and fire dampers.
 - i. Soil, waste and vent piping.
 - j. Major water and gases.
 - k. Rain water drainage piping.
 - l. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
 - m. Above ceiling miscellaneous metal.
 - n. Sprinkler piping and heads.
 - o. All equipment, including items in the Contract as well as OFCI and OFI items.
 - p. Equipment located above finished ceiling requiring access for maintenance and service. In locations where acoustical lay-in ceilings occur, indicate areas in which the required access area may be greater than the suspended grid system.
 - q. Existing conditions, including but not limited to mechanical, plumbing, fire protection and electrical items.
 - r. Seismic Restraints.
- B. Timing: Prior to fabricating materials or beginning work, supervise and direct the creation of one complete set of coordination drawings showing complete coordination and integra-

tion of work, including, but not limited to, structural, architectural, mechanical, plumbing, fire protection, elevators, and electrical disciplines.

- C. Intent: Coordination drawings are for the Contractor's use during construction and are not to be construed as replacing shop drawings or record drawings. Designer's review of submitted coordination drawings shall not relieve the Contractor from his overall responsibility for the coordination of the Work of the Contract.
- D. Base sheets: Designer will provide CAD files for use by the Contractor for the development of building coordination drawing "base sheets" upon signed receipt of Designer's disclaimer form. Contractor is responsible to prepare and provide one accurately scaled set of building coordination drawing "base sheets" on reproducible transparencies showing all architectural and structural work. Base sheets shall be at appropriate scale; congested areas and sections through vertical shafts shall be at larger scale.
 - 1. Highlight all fire rated and smoke partitions.
 - 2. Indicate horizontal and vertical dimensions to avoid interference with structural framing, ceilings, partitions, and other services.
 - 3. Indicate elevations relative to finish floor for bottom of ductwork and piping and conduit (6 inches and greater in diameter).
 - 4. Indicate the main paths for the installation, or removal of, equipment from mechanical and electrical rooms.
- E. Contractor shall circulate coordination drawings to the following subcontractors and any other installers whose work might conflict with other work. Each of these subcontractors shall accurately and neatly show actual size and location of respective equipment and work. Each subcontractor shall note apparent conflicts, suggest alternate solutions, and return drawings to Contractor.
 - 1. Elevator subcontractor.
 - 2. Plumbing subcontractor.
 - 3. Fire protection subcontractor.
 - 4. Heating ventilating and air conditioning subcontractor(s).
 - 5. Electrical discipline subcontractors.
 - 6. Control system subcontractors.
- F. Review and modify and approve coordination drawings in cooperation with individual installers and subcontractors to assure conflicts are resolved before work in field is begun and to ensure location of work exposed to view is as indicated or as approved by Designer.
 - 1. The Contractor shall stamp, sign and submit coordination drawing originals to Designer for review.
 - 2. Do not commence work in areas described in the coordination drawings until receipt of Designer's comments.

1.7 COORDINATION OF CUTTING AND PATCHING

- A. Cutting and patching coordination: The General Contractor is responsible for coordination of all cutting and patching necessary for the completion of this Contract and for the quality and appearance of all patch Work in exposed-to-view finished materials.
1. Do not drill through structural beams, slabs or columns. Core drilling through concrete unit masonry and stair platforms must be approved by the Designer.

1.8 GENERAL PROJECT ADMINISTRATION

- A. Prepare memoranda for distribution to each party involved outlining required coordination procedures. Include required notices, reports, and attendance at meetings.
- B. Prepare similar memoranda for Owner, and separate contractors where coordination of their Work is required.
- C. Conduct conferences among subcontractors and others concerned with the Work, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- D. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project Closeout activities.

1.9 SITE MOBILIZATION (PRE-CONSTRUCTION) CONFERENCE

- A. In accordance with Article V of the CONTRACT AND GENERAL CONDITIONS, a pre-construction conference to review the work will be conducted by the Owner and Designer.
- B. Representatives of the following shall be required to attend this conference:
1. Owner's designated representative(s).
 2. Resident Engineer
 3. Designer
 4. Contractor
 5. All Subcontractors
 6. Applicable Municipal Agencies
- C. The Contractor shall have a responsible representative at the pre-construction conference to be called by the Owner or Designer following the award of the contract, as well as representatives of field or office forces and major Subcontractors. All such representatives shall

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

have authority to act for their respective firms. The pre-construction conference is to be held within five (5) days of Notice to Proceed, or as otherwise determined by Owner.

- D. Contact List: The Contractor shall provide to the Designer and Owner a list containing the following:
1. Contractor's name, address, office and cell phone number, fax number, e-mail address and after-hours emergency phone number.
 2. Contractor's Superintendent name email address and cell phone number.
 3. Each Trade Contractor and subcontractor's name, email address, address, office and cell phone number, fax number and description of the products or services they will provide to the project.
- E. Agenda: Discuss items of significance that affect progress, including the following:
1. Tentative construction schedule.
 2. Phasing.
 3. Critical work sequencing.
 4. Designation of responsible personnel. The Contractor shall identify a Contractor safety representative to interface with the Owner. This person may also fill other roles within the Contractor's project area e.g. project manager, superintendent, foreman, etc .
 5. Procedures for processing field decisions and Change Orders.
 6. Procedures for processing Applications for Payment.
 7. Distribution of the Contract Documents.
 8. Submittal procedures.
 9. Preparation of Record Documents.
 10. Use of the premises.
 11. Safety. An Owner representative will attend the pre-construction meeting for the purpose of orienting the Contractor to policies specific to the Dracut Public Schools, discuss the Contractor's site-specific safety plan, as well as to emphasize recognized safety practices expected on school grounds. The Contractor's Safety Representative is responsible to ensuring this information is disseminated to all Contractor and Trade Contractor employees. If an Owner representative is unable to attend, the Awarding Authority will schedule a separate time when this review may be completed.
 12. Responsibility for temporary facilities and controls.
 13. Parking and construction limits.
 14. Office, work, and storage areas.
 15. Equipment deliveries and priorities.
 16. First aid.
 17. Security.

18. Progress cleaning.
 19. Working hours.
 20. Emergency phone numbers.
 21. Payment procedures and Schedule of Values.
 22. Material deliveries.
- F. Reporting: Minutes of the meeting shall be prepared by the owner's designated representative and shall be distributed to each party present. The Contractor shall be responsible for distributing the minutes to all Filed- Sub Contractor.
- 1.10 PRE-INSTALLATION/PRE-FABRICATION CONFERENCES**
- A. When required in individual specification sections, prior to commencing the work of that trade, convene a pre-installation conference at work site, if possible, on same day as weekly progress meeting.
 - B. Notify Designer and Owner's Project Representative a minimum of one (1) week in advance of meeting date.
 - C. Attendance is required by Contractor's Project Manager and Superintendent, and parties directly affecting, or affected by, work of the Section.
 1. Contractor shall include discussions on waste management goals and requirements in all pre-fabrication meetings conducted with subcontractors, fabricators, and vendors.
 2. Contractor shall include discussions on Owner's environmental goals, procedures and requirements in all pre- fabrication meetings conducted with subcontractors, fabricators, and vendors.

1.11 COORDINATION MEETINGS

- A. In addition to other specified meetings and additional meetings as required. Contractor shall hold project coordination meetings, at least monthly at regularly scheduled times. Hold meetings more frequently when necessary to ensure full coordination of work. Request representation at each meeting by every entity involved in coordination or planning for work of the entire project. Conduct meetings in a similar manner to progress meetings, to resolve coordination problems.
- B. Keep minutes of coordination meetings and distribute copies to all attendees, related parties and to the Owner, Resident Engineer(s), Designer and its engineering consultants within three (3) business days following meeting. Coordination meetings shall continue on an appropriate schedule, even after completion of coordination drawings by Contractor, to review progress and resolve minor conflicts not identified in the coordination drawings.
- C. The following trades shall participate in coordination meetings, preparation of coordination drawings and reviews. Additional trades shall participate as the Contractor deems necessary for proper coordination of the Work.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Concrete work.
 2. Masonry.
 3. Structural steel, light gage metal framing and metal fabrications.
 4. Rough carpentry.
 5. Air and vapor barrier work.
 6. Finish wall and ceiling construction.
 7. Food service equipment.
 8. Elevators.
 9. Fire protection systems.
 10. Plumbing systems, including roof drainage, waste and vent systems and distribution.
 11. Electrical lighting, power, communications and signaling, fire detection and related systems.
 12. Excavation, site utilities and site improvements.
- D. All adjustments necessary to achieve full coordination shall be determined in a timely manner, so as not to delay the work. Include time necessary for consideration by the Designer and Resident Project Representative(s) for proposed modifications. No claim for additional compensation for extension of time arising from delays due to failure of Contractor to identify potential conflicts requiring coordination in a timely manner or from additional work made necessary by such failure will be valid.

1.12 PROJECT MEETINGS

- A. Project meetings shall be held on a weekly basis, and as additionally required subject to the discretion of the Owner's Project Manager.
1. The Contractor shall schedule and administer meetings throughout the progress of the Work at regular intervals; make arrangements for meetings, prepare agenda with copies for participants, preside at meeting and record minutes.
 - a. Distribute copies within 24 hours to Designer, Owner's Project Manager, and participants, and to those affected by decisions made. Designer will review and send comments within 2 working days from receipt of minutes.
 - b. Scheduled Frequency of Meetings: Weekly.
- B. Attendees: In addition to the Owner's Project Manager and Designer, Contractor's Project Manager and Project Superintendent, and each Trade Contractor, applicator, installer, and supplier whose work is on-going or scheduled. Engineering consultants, and other team persons are required to attend as the Designer may direct. Trade Contractors, subcontractors, vendors, suppliers shall be present at meetings upon request of Contractor.
1. Attendee Authority: Trade Contractors, subcontractors and supplier representatives present at meetings shall have authority to act for and make commitments for, the entity which they represent.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2. Restricted Attendance: Owner and Designer reserve the right to expel or exclude from any Progress Meeting any person(s) or company representative(s) without statement of reason or excuse.
 3. Attendance of Designer's Consultants: Contractor shall make an attendance request for specific Designer's consultants and engineers at least 72 hours in advance of the meeting. Clearly identify and request all consultant related issues and topics to be discussed at the meeting. The Designer will decide if its consultant or engineer will attend.
 4. Attendance of Owner's Independent Consultants: Contractor shall make an attendance request for specific Owner's consultants at least 72 hours in advance of the meeting. Clearly identify In the request all consultant related issues and topics to be discussed at the meeting. The Owner will decide if its consultant(s) will attend.
- C. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 2. Review present and future needs of each entity present, including the following:
 - a. Review minutes of previous meetings.
 - b. Review of Work progress.
 - 1) Progress of Work to be adjusted under coordination requirements and includes effect of proposed changes on progress schedule and coordination.
 - c. Maintenance of progress schedule.
 - d. Corrective measures to regain projected schedules.
 - e. Interface requirements and coordination of projected progress.
 - f. Sequence of operations.
 - g. Identifications of problems which impede planned progress.
 - h. Field observations, problems, and decisions.
 - i. Review of submittals schedule and status of submittals.
 - j. Review of off-site fabrication and delivery schedules.
 - k. Deliveries.
 - l. Site access.
 - m. Site utilization.
 - n. Temporary facilities and controls.

- o. Manpower.
 - p. Hazards and risks.
 - q. Review of construction waste management and recycling performance, material quantities disposed and diverted for recycling.
 - r. Progress cleaning.
 - s. Quality and work standards.
 - t. Change Orders.
 - u. Documentation of information for payment requests.
 - v. Maintenance of quality and work standards.
 - w. Other business relating to Work.
- D. As a prerequisite for monthly payments, ordering schedules, shop drawing submitted schedules, and coordination meeting schedules shall be prepared and maintained by the Contractor and shall be revised and updated on a monthly basis, and a copy shall be submitted to the Owner Project Manager and Designer.
- E. In order to expedite construction progress on this project, the Contractor shall order all materials immediately after the approval of shop drawings and shall obtain a fixed date of delivery to the project site for all materials ordered which shall not impede or otherwise interfere with construction progress. The Contractor shall present a list and written proof of all materials and equipment ordered (through purchase orders). Such list shall be presented at the meetings and shall be continuously updated.
- F. Scheduling shall be discussed with all concerned parties, and methods shall be presented by the Contractor, which shall reflect construction completion not being deferred or foreshortened. Identify critical long-lead items and other special scheduling requirements. The project schedule is to include time for submission of shop drawing submittals, time for review, and allowance for resubmittal and review.
- G. Minutes of the project meetings shall be prepared by the owner's representative and shall be distributed to all present. The owner's representative meeting minutes shall be the only official meeting record. Minutes shall enumerate each topic item, and each topic shall be updated at each progress meeting. Actions to be taken for each topic shall be recorded, along with identification of the party responsible for each action item. Items shall not be removed from the Minutes until all issues with each item have been resolved.

1.13 SPECIAL PROJECT MEETINGS

- A. Special project meetings: The Contractor shall conduct special project meetings as required throughout the course of the Work. Special Project Meetings are those held in addition to the regularly scheduled progress meetings. The Designer and Owner are not required to attend these meetings. Special meeting issues include, but are not limited to:
1. Safety issues.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2. Labor issues.
 3. Construction waste management and recycling issues.
 4. Special scheduling issues.
- B. Environmental Quality Review Meetings: The Contractor shall conduct special Environment Quality review meetings throughout the course of the Work.
1. Meetings may be held in conjunction with dates of Project Progress Meetings. The Contractor shall notify both the Owner and Designer at least seven (7) days in advance of the meeting dates. The General Contractor along with any requested or necessary Trade Contractors, subcontractors, applicators, vendors or material suppliers shall attend.
 2. Meeting shall include the following topics:
 - a. Review of construction waste management and recycling.
 - b. Review of indoor air quality testing.
- C. Additional Special Meetings requested by the Designer or Owner: The Contractor along with any requested or necessary Trade Contractors, subcontractors, applicators, vendors or material suppliers shall attend additional meetings when requested by the Designer or Owner as they deem necessary. Such meetings may be convened on short notice if conditions at the project site so require and attendance is mandatory. The Designer and Owner are not limited as to the number of additional meetings that may be requested, or the agenda for such meetings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Submittal coordination.
- B. Contractor's Responsibilities
- C. Submittal procedures and grading.
- D. Owner's environmental policy.
- E. Shop drawings, product data and samples.
- F. Manufacturer's instructions.
- G. Manufacturer's certificates.
- H. Emergency addresses.
- I. Erosion and sediment control program.
- J. Schedule of Values

1.3 SUBMITTAL COORDINATION

- A. If submittals are rejected or returned to the Contractor two (2) times, the Contractor shall take appropriate action to provide an approvable final third submission. The Designer shall have no obligation to review any submittal rejected or returned three (3) times.
- B. General: The Contractor is fully responsible for delay in the delivery of materials, progress of the Work and damages incurred due to Contractor's failure to submit, revise and resubmit submissions in accordance with the requirements herein, in adequate time to allow the Designer checking and processing of each submission or resubmission.
- C. Make submittals in a proper and timely fashion, allowing for administrative procedures, Designer's review, corrections to submissions and resubmittal, if necessary, and fabrication of products without delaying the project. Minimum processing times required by the Designer are as follows:
 1. Review for Designer's Office only: Allow a minimum of 10 working days for review and processing. Some submittals may require additional time.
 - a. Simultaneous submission of a large number of shop drawings and product data may require longer than 10 working days for review.

- b. Complex Systems may require longer than 10 working days for review each time shop drawings, layout drawings, and product data are submitted or resubmitted.
 - 2. Review by Designer and its consultant(s): Allow 10 working days for review and processing of submittals by Designer plus an additional 5 working days for review by each consultant as applicable.
 - 3. Reprocessing of submittals: For submittals requiring resubmittal, re- processing time required shall be the same as first submittal.
 - 4. No extension of Contract Time will be authorized due to failure to transmit submittals sufficiently in advance of scheduled performance of work.
- D. Make submittals of similar items, systems, or those specified in a single specification section together.
- E. Make submittals for products which other products are contingent upon, first.

1.4 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor is responsible to review ALL Shop Drawings, Product Data and Samples prior to submission. Verify the following:
 - 1. Proper title, original date, drawing number (which shall be changed if resubmitted), revision numbers and dates, designation of project Contractor, Trade Contractor, subcontractor and/or supplier.
 - 2. Identification of Shop Drawings, Product Data or Samples by Specification Section and subsection or paragraph where appropriate and identification of Contract Drawings by number and detail.
 - 3. On each submittal, as a minimum, Contractor shall identify the following:
 - a. Errors, inconsistencies, and omissions discovered in the contract documents and field conditions must be reported at once to the Designer.
 - b. Any variations from code requirements contained in the contract documents must be reported promptly in writing to both the Designer and owner.
 - c. Promptly report to the Designer information that any design, process, or product infringes on a patent.
 - d. Names of Trade Contractor, subcontractor and suppliers must be given in writing to the Designer as soon as practicable after award of the Contract, preferably at the pre-construction meeting. (Note: If objection is made, a change order is possible.) List shall include name(s) of contact person(s), address, telephone and fax number(s).
 - 4. Field measurements are on Shop Drawings, and Contractor has verified field measurements.
 - 5. Field construction criteria.
 - 6. Catalog numbers and similar data.
 - 7. Conformance with Specifications.

- a. Is the product an equal to the product specified or a substitution? If either of these occur a comparison sheet must be submitted comparing the proposed product to the product specified.
 8. Quantities.
 9. Integration with adjoining work.
 10. Delivery schedule.
- B. All shop submittals prepared by Trade Contractors and subcontractors shall be processed through the Contractor. The Contractor shall check all the shop submittals for conformity with the Contract Documents and particularly for field measurements and proper fit with adjoining work prior to submitting same to the Designer for approval. Certification shall appear on each shop drawing stating that the Contractor has made his/her check. Format and content of the Contractor's certification stamp shall be subject to approval by the Owner's Project Manager and the Designer and shall include, but not be limited to:
1. The Term "By Others" shall not be used on shop submittals, the Contractor shall state by whom related items are to be furnished and/or installed.
 2. The Designer reserves the right to reject and return to the Contractor, without examination, any shop drawings which have not been previously checked and certified as outlined above, which carry the term "by other" or such vague reference, which are difficult to read, or which in any way are obviously not in conformity with Contract Requirements.
 3. Shop drawings shall show materials, design, dimensions, connections and other details necessary to ensure that they accurately interpret the Contract Documents and shall also show adjoining work in such detail as required to provide proper connection with same.
 4. The Designer will check and approve shop drawings only for conformance with the Contract Documents. Approval of shop drawings by the Designer will not release the Contractor from his responsibility for furnishing same of proper dimensions, size quantity and quality to effectively perform the work and carry out the requirements and intent of Contract Documents.
 5. Such approval will not relieve the Contractor from responsibility for errors of any sort in the shop drawings, nor for the proper coordination of any submittal with all other work. If the shop drawings deviate, or are intended to deviate, from the Contract Documents, the Contractor shall so advise the Designer in writing at the time the shop drawings are submitted, stating the difference in value between the Contract requirements and that denoted by said shop drawings.
 6. The Contractor shall assume full liability for delay attributed to insufficient time for delivery and/or installation of material or performance of the work when approval of pertinent shop drawing is withheld due to the failure of the Contractor to submit, revise, or resubmit shop drawings in adequate time to allow the Designer and the Owner's Project Manager not to exceed the specified timeframe for normal checking, and processing of each submission or resubmission.
- C. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Designer's review and approval of submittals, unless Designer gives tentative written

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

acceptance of specific deviations identified as such by the Contractor, subject to written concurrence by the Owner's Project Manager.

- D. Notify the Designer in writing at the time of submission, of deviations in submittals from requirements of Contract Documents or previous submissions.
- E. Work that requires submittals shall not commence unless submitted with Designer's stamp and initials or signature indicating review and approval, and Owner's Project Manager's initials or signature of concurrence indicate review and approval.
 - 1. No work shall be started in the shop or on the job, or materials delivered to the site, until pertinent shop drawings have been approved by the Designer and the Owner's Project Manager.
- F. After aforesaid review and approval, distribute copies.
- G. Maintain two hardcopies of each approved submittal at the project site. One for the Contractor and one for the Owner's Project Manager.

1.5 SUBMISSION REQUIREMENTS AND QUANTITIES

- A. General Protocol for Shop Submittals:
 - 1. Submittal for Review: Contractor submits to Designer, with copies directly to Owner's Project Manager, Owner's designated representative and relevant design consultant(s).
 - 2. Unapproved submittals returned as "Revise and Resubmit", or "Rejected": Designer returns electronic submittal to Contractor, and Designer copies Owner's Project Manager.
 - 3. Approved submittals returned as "Approved" or "Approved as Corrected"
 - a. Designer returns electronic submittal to Contractor, and Designer copies Owner's designated representative.
 - b. Contractor issues submittal to appropriate trades and subcontractors.
 - 1) Contractor issues one paper copy (hard copy) of submittal to Owner.
- B. Documentation: Furnish electronic files through the Adobe Acrobat Portable Document Format (PDF) files, for each of the following submittal types:
 - 1. Schedules, including, but not limited to:
 - a. Construction Schedule.
 - b. Schedule of Values.
 - c. Schedule of shop drawings, product data, and samples.
 - d. Schedule of Environmental Submissions.
 - 2. Shop drawings.
 - 3. Product data, manufacturer's instructions and certificates and similar submissions.
 - 4. Erosion control program.

5. Waste Management reports.
 6. Emergency addresses.
- C. Samples: Furnish Designer with the following quantities of the following physical submittals (samples) with transmittal form. On transmittal form, identify Project, Contractor, Trade Contractor, subcontractor, installer, or supplier, pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate. Transmittals received by the Designer from sources other than the Contractor will be returned without any action taken:
1. Samples: Sets of TWO (2) identical samples of each submission required.
 - a. Deliver one (1) copy to Designer
 - b. Deliver one (1) sample to Owner
- D. Transmit all submittals with transmittal form or cover. identify Project, Contractor, Trade Contractor, subcontractor, installer, or supplier, pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
1. Contractor shall number submittals sequentially by Specification Section prior to submittal. Resubmitted items shall retain number and be noted as resubmitted (example 260000-1 R1).
 2. Transmittals received by the Designer from sources other than the Contractor will be returned without any action taken.

1.6 OWNER'S ENVIRONMENTAL POLICY

- A. Schedule: Immediately after being awarded the Contract, meet with the Designer and Owner to discuss the schedule of environmental policy submissions and then prepare and submit within 14 calendar days for approval a schedule of submissions related to the Owner's Environmental Policy.
1. The "Schedule of Environmental Submissions" shall be related to the entire Project, including commissioning, and as a minimum contain the following items.
 - a. Affidavit letters.
 - b. Construction Indoor Air Quality (IAQ) plan.
 - c. Manufacturer's product information and MSDS sheets.
 2. Update schedule throughout progress of the Project, coordinated with scheduling changes in the Work, and redistribute monthly in conjunction with submittal of Application for Payment.

1.7 SUBMITTAL PROCEDURES AND GRADING

- A. Prepare and deliver to the Designer, and Owner, all specified and requested submittals, as specified herein.
- B. Provide space for Contractor, Designer and engineering consultant review stamps, on the front

page of each item's submittal copy. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and the Contract Documents. The Designer will insert the date of action taken and an identification of the person taking the action.

1. Submittal grading:
 - a. APPROVED - No corrections, no marks.
 - b. APPROVED AS CORRECTED - Resubmission not required. Minor amount of corrections; all items can be fabricated without further corrections to original submission; checking is complete, and all corrections are deemed obvious without ambiguity.
 - c. APPROVED AS CORRECTED RESUBMIT FOR RECORD- Resubmission is required for proof of corrections to original submission. Moderate amount of corrections; all items can be fabricated with corrections and resubmission, and without re-approval. Checking is complete, and all corrections are deemed obvious without ambiguity.
 - d. REVISE AND RESUBMIT - Resubmission required. Minor amounts of corrections; checking is not complete; details of items noted by checker are to be clarified further before full review can be given. Correct and resubmit, do not fabricate noted items requiring correction.
 - e. REJECTED - Submittal is rejected as not in accord with the Contract Documents, too many corrections, or other justifiable reasons. When returning submission, Designer will state reasons for rejection. Correct and resubmit, do not fabricate.
 2. Review/approval neither extends nor alters any contractual obligations of the Designer, Engineer or Contractor.
 - C. Identify all variations from Contract Documents, and product or system limitations which may be detrimental to successful performance of the completed work.
 - D. Transmit samples to Designer with individual transmittal forms for each submission as specified herein above in the Article entitled "SUBMISSION REQUIREMENTS AND QUANTITIES".
 - E. Revise and resubmit submittals as required, identify all changes made since previous submittal. Distribute copies of reviewed submittals to concerned parties; instruct parties to promptly report any inability to comply with provisions.
- 1.8 SHOP DRAWINGS
- A. General: Provide accurately prepared, large scale and detailed shop drawings prepared specifically for this Project. Shop drawings shall include fabrication and installation drawings,

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

setting diagrams, schedules, patterns, templates and similar drawings. Standard information prepared without specific reference to Project are not considered shop drawings.

1. Show adjacent conditions and related work. Show accurate field dimensions where appropriate.
 2. Identify materials and products shown. Note all conditions where require coordination with other trades and special installation procedures.
 3. Show gage and thickness of materials.
 4. Indicate welding details and joint types.
 5. Show every component of fabricated items, notes regarding manufacturing process coatings and finishes, identifying numbers conforming to the Contract Documents dimensions, and appropriate trade names.
 6. Show anchorage and fastening details, including type, size and spacing.
 7. Review each submittal for conformity with the Contract requirements prior to submittal, certify such review on each shop drawing with Contractor's stamp, signature and date. Reference on shop drawings to other sections, installers, suppliers, or trade(s) shall designate the appropriate specification sections, and the term "by others" shall not be used.
- B. Size of Format: Not less than 8-1/2 by 11 inches, and no larger than 30 by 42 inches, except for templates, patterns and similar full-size drawings.
- C. The Designer's comments and corrections will be made on the electronic submission (PDF) and returned to the Contractor. If necessary, the Contractor then shall make the necessary corrections on the original drawings and resubmit the corrected drawings in electronic format (PDF) as specified. Prints of any submittals required for the Designer's own use, and those of engineering consultants, will be made without cost to the Contractor. The Contractor is responsible to distribute and furnish (at no additional cost to Owner) all shop documents needed for use by the Contractor, Trade Contractors, subcontractors, installers, vendors and suppliers.
- D. The Designer's comments and corrections will be made on the original and returned to the Contractor. If necessary, the Contractor then shall make the necessary corrections on the original drawings and resubmit the corrected drawings in manner specified. All additional prints required for the Designer's own use, and those of engineering consultants, will be made without cost to the Contractor. The Contractor is responsible to furnish (at no additional cost to Owner) all prints needed for use by the Contractor, Trade Contractors, subcontractor, installers, vendors and suppliers.
1. Shop Drawings returned with stamp "APPROVED", or "APPROVED AS CORRECTED": Contractor shall obtain and distribute adequate prints for construction, including one print of each for the Owner's project representative, and then return the originals to the subcontractor or supplier from whom he originally received them.
 2. Shop Drawings returned with stamp "APPROVED AS CORRECTED – RESUBMIT FOR RECORD": Contractor or its subcontractor or supplier shall make necessary

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

corrections prior to distribution. After corrections are made, obtain and distribute adequate prints for A/E record and for construction, including one print of each for the Owner's project representative, and then return the transparencies to the subcontractor or supplier from whom he originally received them.

3. Shop Drawings returned with stamp "REJECTED" or "REVISE AND RESUBMIT": Contractor shall first obtain a record print and then forward them to source for correction of original drawings, and resubmission of a new transparency and prints as above.
- E. Each drawing shall have a title block on the right-hand side including the following information: Name of Project, Project Number, Designer, Contractor, Trade Contractor/subcontractor, Vendor/Supplier, Date of Submission.
- F. Each submittal shall have a clear space for review stamps of both the Designer and Contractor.
 1. The Contractor's Review and Action Stamp: Provide suitable space on label or title block for Contractor's review and action stamp. Stamp and sign each submittal to show Contractor's review and approval prior to transmittal Designer. Submittals not signed and stamped by Contractor will be returned without action.
 - a. Only submittals received from the Contractor will be considered for review by the Designer. Contractor shall review each submittal for accuracy and conformance with the requirements of the Contract Documents, and particularly for field measurements and proper fit with adjoining work. Modify submittals as required to show interface with adjacent work and attachment to Building.
 - b. The Contractor's Review and Action Stamp shall contain the following language or similar:

APPROVED FOR CONFORMANCE
WITH THE CONTRACT DOCUMENTS.

All dimensions and quantities have been reviewed and are
accepted by _____
XX Construction Company

All dimensions and field conditions have been or will be
verified prior to fabrication of the items described herein.
 - c. Submittals received from the Contractor shall be signed and comply with review requirements. Submittals not certified or improperly certified (stamped but not reviewed) will be returned to the Contractor without Designer's review. Claims due to the return of uncertified, improperly prepared or inadequately reviewed submittals will be rejected.

1.9 PRODUCT DATA

- A. Submit Product data as specified, and as the Designer may additionally prescribe. Product data includes, but is not limited to:
 1. Catalog cuts.
 2. Complete specifications.

3. Standard color charts.
 4. Performance data.
 - a. Compliance with recognized trade association standards.
 - b. Compliance with recognized testing agency standards, labels and seals.
 5. Environmental data including, but not limited to:
 - a. Chemical composition.
 - b. Recycled (pre- and post-consumer) content.
 - c. Locations of material extraction/harvest and manufacture, with respective distances to site.
 - d. VOC content.
 - e. Material certifications as applicable to product.
 6. Certified laboratory test report data.
 7. Health and safety precautions.
 8. Illustrated capacities, characteristics, wiring diagrams, controls, and other pertinent information for complete product and product use description.
- B. If more than one size or type is shown on any printed sheet, indicate clearly intended item(s).

1.10 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturer's printed instructions for delivery, handling, storage, assembly, installation, start-up, adjusting, and finishing.
- B. Identify conflicts between manufacturer's instructions and Contract Documents.

1.11 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturer's certificates and installer certificates to Designer for review.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Designer.

1.12 EMERGENCY ADDRESSES

- A. Within 15 days of Notice to Proceed, submit in writing, the name, addresses and telephone numbers of key members of their organization including Contractor's Superintendent and personnel at the site, to be contacted in the event of emergencies at the building site, which

may occur during non-working hours.

1.13 EROSION AND SEDIMENT CONTROL PROGRAM

- A. Submit erosion and sediment control program within 5 days after date of Owner- Contractor Agreement for Designer's review. Revise and resubmit as required.
- B. Erosion and sediment program shall indicate proposed methods, materials to be employed, and schedule for effecting erosion and siltation control and preventing erosion damage. Provide sufficient information to fully explain the program; the following are the minimum requirements:
 1. Proposed methods for actuating erosion and siltation control including 1 inch equals 40 feet (1" = 40') scale plans indicating location of erosion control devices and siltation basins.
 2. List of proposed materials including manufacturer's product data, in accordance with Division 31 - EARTHWORK and Division 33 - EXTERIOR IMPROVEMENTS.
 3. Schedule of and sediment control program indicating specific dates from implementing programs in each major area of Work.

1.14 SCHEDEULE OF VALUES

- A. Prior to the first request for payment, the General Contractor shall submit to the Designer and the Owner, a Schedule of Values of the various portions of the Work in sufficient detail to reflect various major components of each Trade Contractor and subcontractor, including quantities when requested, aggregating the total contract sum, and divided so as to facilitate payments for work under each Section. The schedule shall be prepared in such form as specified, or as the Designer, or the Owner may approve, and it shall include data to substantiate its accuracy. Each item in the Schedule of Values shall include its proper share of overhead and profit. This schedule, including breakdown and values, requires the approval of the Designer and the Owner and shall be used only as a basis for the General Contractor's request for payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 REQUIREMENTS INCLUDED

- A. Contractor's Quality Assurance.
- B. Contractor's Testing Responsibilities.
- C. Awarding Authority's independent agencies.
- D. Duties of the Contractor's testing agencies.
- E. Compaction of Gravels.
- F. Paving.
- G. Field engineering.
- H. Examination of substrate.
- I. Contractor's Quality Assurance and Quality Control Plan.

1.3 RELATED SECTIONS

- A. Section 013100 – PROJECT MANAGEMENT AND COORDINATION:
 - 1. General project management and coordination.
- B. Section 014325 – TESTING AGENCY SERVICES:
 - 1. Testing to be performed by the Owner's Independent Testing Laboratory, exclusive of testing to be performed by the Contractor.

1.4 CONTRACTOR'S QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage inspection and testing services agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
- B. Each independent inspection and testing agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the Commonwealth of Massachusetts.

1.5 CONTRACTOR'S TESTING RESPONSIBILITIES

- A. The Contractor shall provide inspections, tests and quality control services specified in individual specification Sections and required by governing authorities, except where they are specifically indicated to be solely the responsibility of a Subcontractor in the respective specification section or solely the responsibility of the Owner.
- B. Engage and pay for the services of an independent agency acceptable to the Owner to perform the specified inspections, testing, and quality control. Submit qualifications to the Owner. Contractor's testing agency/laboratory shall be licensed by the Commonwealth of Massachusetts Department of Public Safety.
- C. Re-testing: The Contractor is responsible for re-testing where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Documents requirements, regardless of whether the original test or service was the Contractor's responsibility.
- D. Substitutions, Suspicious Issues and Designer Initiated Testing: The Contractor is responsible for inspections, tests and similar services for substitutions, suspicious issues identified by the Contractor or Owner, and testing initiated by the Designer.
- E. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as required. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
 - 1. Provide access to the work and furnish incidental labor and facilities necessary to facilitate inspections and tests.
 - 2. Take adequate quantities or representative samples of materials that require testing or assist the agency in taking samples.
 - 3. Provide facilities for storage and curing of test samples and delivery of samples to testing laboratories.
 - 4. Provide the agency with a preliminary design mix proposed for use for material mixes that require control by the testing agency.
 - 5. Provide security and protection of samples and test equipment at the project site.
- F. The Contractor shall prepare and submit to the Owner for approval a Quality Assurance and Quality Control Plan within 30 days from Notice to Proceed. A Quality Assurance and Quality Control (QA/QC) Plan shall promote completion of all work in accordance with the Contract Documents including Contract, Construction Drawings, Specifications, Project Procedures, Approved Submittals and Shop Drawings, Approved Changes, Applicable Codes and Regulations, Referenced Industry Standards, and similar items. The primary purpose of this quality plan is to ensure that all in place work by the Contractor and all Subcontractors is performed correctly the first time and is turned over and represented as complete and defect free

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

in accordance with the Contract Documents.

- G. If required by the Contract, the Contractor shall assign a dedicated Quality Assurance and Quality Control Manager for the duration of the project. If the Contract does not require a dedicated Quality Assurance and Quality Control Manager, the Contractor shall prepare and submit to the Owner their QA/QC Plan as discussed in Par. E above. In addition, if this Contract does not require a dedicated QA/AC Manager, the duties of the QA/AC Manager as delineated in Par. 1.5F6 shall be carried out by another qualified member of the Contractor's onsite staff.
1. The purpose of a QA/QC Manager shall be to prepare and submit the Quality Assurance and Quality Control Plan for approval and to be responsible for and to manage adherence to the plan throughout the construction process. The QA/QC Manager shall be designated for the project from the initial notice to proceed through system acceptances by both the designer and Owner. The QA/QC Manager shall at all times instill an expectation that all work will be completed correctly and in an expeditious manner and shall be responsible for enforcement of the Contractor's Staff and all Subcontractors to this plan.
 2. Have extensive experience in building construction, project controls, and previous QA/QC training and practical knowledge.
 3. Have excellent communication and writing skills, be highly organized and be able to work with both management and Subcontractors.
 4. Have a working knowledge of project scheduling.
 5. The Contractor shall submit substantiating documentation attesting to the proposed QA/QC Manager's capabilities to the Owner and the Designer for approval.
 6. Duties of the QA/QC Manager:
 - a. Prepare and submit QA/QC Plan for approval.
 - b. Conduct and submit minutes for all requisite Quality Meetings.
 - c. Coordinate and report on all daily quality activities.
 - d. Verify accurate documentation by Subcontractors and Vendors.
 - e. Oversee final project records pertaining to quality.
 - f. Report, photograph and distribute evidence of deficient and/or defective construction conditions or materials that cannot be corrected within three (3) workdays of observation. When such conditions or materials are remedied report, photograph and distribute evidence of remedial work prior to concealing. Photographs shall be dated, and defects and/or deficiencies shall be clearly labeled on the photographs.

1.6 AWARDING AUTHORITY'S INDEPENDENT TESTING AGENCIES

- A. Awarding Authority will engage an independent testing agency at its own expense to

perform certain tests and similar services as set forth in Section 014325. Information provided by Awarding Authority's Independent Testing Agency shall be for the sole use of Awarding Authority's Project Manager and shall not relieve the Contractor of its responsibilities to provide its own quality control, to meet all requirements of the Contract and to provide a completed project free from construction defects.

- B. It is the Contractor's responsibility to provide and pay for its own inspection and testing to assure quality control. Contractor shall be responsible for coordinating its work with requirements of Awarding Authority's testing agencies and shall provide reasonable services in support of facilitating work of Awarding Authority's testing agencies as required.

1.7 DUTIES OF THE CONTRACTOR'S TESTING AGENCIES

- A. The Contractor's independent testing agency engaged to perform inspections, sampling and testing of materials and construction shall cooperate with the Designer and Contractor in performing its duties, and shall provide qualified personnel to perform required inspections and tests.
- B. The testing agency shall notify the Designer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
- C. The testing agency shall not perform any duties of the Contractor.
- D. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.8 MANUFACTURER'S REPRESENTATIVES

- A. If required by specific Specification Sections, manufacturer's representative shall be present at the job site for supervision of work during installation of materials. Such representative shall be present during all aspects of construction to ensure proper installation of all applicable items. Refer to other sections of these specifications for additional requirements.

1.9 FIELD ENGINEERING

- A. Survey work through the course of all phases of construction shall conform to the following guidelines:
 1. Contractor shall employ a competent Civil Engineer or Land Surveyor, registered in the Commonwealth of Massachusetts, who will establish permanent benchmarks. Maintain all established bounds and benchmarks and replace as directed any which are destroyed or disturbed.
 2. Prior to the installation of permanent construction (foundations, slab-on-grade,

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

utilities, etc.) Contractor shall provide a certification signed by Engineer/Surveyor warranting the principal lines, levels, and overall dimensions are accurately established in accordance with the Contract Documents.

3. Establish all lines and grades for the work, and verify all locations, property lines, work lines and other dimensioned points indicated on the Drawings for the project site.
4. Submit to the Designer a written confirmation of locations of all lines, and any discrepancies between conditions and locations as they actually exist and those indicated on the Drawings. Contractor shall not commence any excavation or construction work until verification has been received and approved by the Designer. Upon receipt of approval from the Designer, provide one (1) copy of that approval to the Resident Engineer.
5. Contractor shall be held responsible for any damage incurred thereby to the Commonwealth, due to incorrect laying out of the work. In the event that errors or discrepancies are discovered on the Drawings, the Contractor shall immediately notify the Designer and no further work shall be performed until the discrepancy has been corrected by the Designer.

1.10 EXAMINATION OF SUBSTRATE

A. Installers of materials, products or equipment shall:

1. Examine base surfaces upon which materials, products or equipment are to be installed.
2. Examine conditions upon which materials, products or equipment are to be installed.
3. Where there is any question as to the dryness of a surface, test with a modern moisture- indicating machine.
4. Notify the Contractor, in writing, with a copy to the Designer, if conditions are detrimental to proper and timely construction and completion of the work.

B. Do not proceed with work until unsatisfactory substrate, or not acceptable conditions have been corrected. Commencement of installation constitutes acceptance of substrate or base surfaces, and the cost of any corrective work due shall be borne by the installer applying his/her materials, products or equipment thereon.

1.11 CONTRACTOR'S QUALITY ASSURANCE AND QUALITY CONTROL PLAN

A. The Contractor's Quality Assurance and Quality Control Plan shall instill an expectation that all work will be completed correctly and in an expeditious manner. In all instances the Contractor shall be responsible for the adherence to and enforcement of the Contractor's Staff and all Subcontractors to this plan.

1. Submit the Contractor's Quality Assurance and Quality Control Plan to the Owner within 30 days from the Notice to Proceed. Submit in format acceptable

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

to Awarding Authority's Project Manager. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

- B. The Plan shall include specific procedures for conducting formalized inspections of predetermined selected work items at the time the Contractor first starts new work. These inspections are performed by a designated QA/QC Inspection Team composed of authorized representatives from the Owner, the Contractor, Designer, Trade Contractor(s) (whose work is being inspected) and others as may be required.
- C. The Quality Assurance and Quality Control Plan shall be created as a Contractor Project Specific Quality Plan addressing at a minimum the following components:
 - 1. Quality meetings.
 - a. Pre-construction conference.
 - b. Pre-installation review meetings.
 - c. Coordination meetings.
 - 2. Regular Daily Inspections.
 - 3. First Delivery of Material / Equipment Inspections.
 - 4. First Equipment in Place Inspections.
 - 5. Bench Mark Inspections.
 - 6. Follow-Up Bench Mark Inspections.
 - 7. Below Grade Inspections.
- D. Quality Meetings:
 - 1. Pre-construction Conference:
 - a. A conference held to discuss all aspects of the construction project such as the schedule, payment procedures, change order procedures and much more. This meeting is held immediately after contract award.
 - b. The Owner, Designer, Design Consultants, Contractor and Subcontractors will attend these meetings.
 - 2. Pre-Installation Review Meetings:
 - a. A review meeting shall be held for certain kinds of work requiring special coordination efforts between Subcontractors, a better understanding of how the work is to be performed by one or more Subcontractors, sequencing of work between the Subcontractors, or a review of special requirements pertaining to the work to be performed. This type of meeting is conducted just prior to starting the actual work. The meeting is scheduled and run by the Contractor on an as needed basis.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- b. The Owner, Designer, Contractor and all applicable Subcontractors will attend these meetings.
 - c. The Contractor's Staff and Subcontractor's actual supervisory people who will be performing the work in the field are to attend these meetings.
 - d. Safety precautions relating to the work to be performed are also to be discussed as part of this meeting.
3. Coordination Meetings:
 - a. The Contractor shall conduct project Coordination Meetings at regular intervals. Project Coordination Meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings. An example would be regularly scheduled MEP coordination meetings to monitor the progress of the MEP coordination process.
 - b. Contractor shall request representation by every party currently involved in coordination or planning for the construction activities involved.
 - c. Contractor shall record meeting results and distribute copies to everyone in attendance and others affected by decisions or actions resulting from each meeting. The Owner and the Designer are to be on the Distribution List.

E. Regular Daily Inspections:

1. The Contractor will monitor the quality of the in-place construction work daily, to ensure that it complies with the requirements of the Contract Documents, Pre-Construction Meetings, Pre-Installation Meetings and Coordination Meetings.
2. The Contractor shall log, record and distribute daily record of quality monitoring as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action
3. The QA/QC Inspection Team will inspect work periodically based on observations noted in Contractor's reporting to verify completion and compliance.

F. First Delivery of Material/Equipment Inspection:

1. The Contractor shall manage and keep current an anticipated delivery schedule for all materials and equipment to be delivered to the site and provide regular updates or upon request to the Owner and QA/QC Inspection Team.
2. The Contractor shall log, record and distribute any account on the first delivery of each type of material or equipment as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action
3. First deliveries will be verified against the requirements of the design documents and the approved submittals. Nonconforming materials and/or equipment will

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

not be allowed to be set into place and will be removed from the site.

4. This inspection establishes the basis for judging all future deliveries of like material/equipment.

G. First Equipment in Place Inspection:

1. The Contractor shall manage, and keep current, an anticipated schedule for all materials and equipment to be inspected in place and provide regular updates or upon request to the Owner and QA/QC Inspection Team.
2. Contractor and QA/QC Inspection Team will inspect and document the first setting of equipment to verify it is in conformance with the requirements of the Contract Documents.
3. The installation and assembly will be verified against the requirements of the design documents and the approved shop drawings.
4. The Contractor shall log, record and distribute any account for each type of first in place equipment inspection as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action or pending inspection.
5. Upon acceptance of the equipment in place, the Contractor can proceed with permanently anchoring it into place by the means prescribed in the Contract Documents.
6. This inspection establishes the basis for judging all future setting of like equipment.

H. Benchmark Inspections (In Sequence Work):

1. The Contractor in consultation with the Owner, Designer and QA/QC Inspection Team will establish which work will be scheduled for benchmarking during the normal course of construction.
2. The Contractor shall log, record and distribute any account of Benchmark(s) as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up, and that require inspection.
3. Contractor shall note that the work to be inspected has been started and if found to be acceptable shall call for a benchmark inspection to be conducted by the QA/QC Inspection Team.
4. The QA/QC Inspection Team shall review, comment that the work appears in conformance to the requirements. Comments are documented and distributed by the Contractor. Non-conforming work will be corrected at no additional cost to the Commonwealth.
5. This inspection establishes the basis for judging all future work of a like type, none of which shall commence until the benchmark is approved.
6. The Benchmark process and inspection(s) does not take away from the

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

responsibility of the Contractor and installing contractors to provide a finished and fully functioning product and to maintain the construction schedule.

I. Follow-Up Benchmark Inspections:

1. The Contractor shall ensure that all subsequent work being built of the same type of work that was previously benchmarked will be built in conformance to the Benchmarked work without deviation.
2. The Contractor and QA/QC Inspection Team will randomly inspect subsequent work being built of the same type of work that was previously benchmarked to ensure the work is being built in conformance with the benchmarked work.
3. The Contractor shall log, record and distribute any account of follow-up benchmark(s) as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up, and that require inspection.

J. Below Grade Inspections:

1. It is the intent of this section to mandate inspection of as much of the work that is to be enclosed before it has been covered over to avoid having to reopen closed spaces to complete or correct work therein.
2. The Contractor shall verify that all work is complete within the concealed space and is ready to be inspected before it is enclosed.
3. The Contractor and all Subcontractors who have work installed within the work area shall sign a closure form stating that their work has been completed and has been inspected by all applicable code officials. Contractor will be responsible for all costs to have the space reopened later to complete or correct any work within the space, and to have the space closed again, including all costs incurred for any schedule impacts due to this work.
4. Photographs of areas to be permanently enclosed will be taken by Contractor and retained as a part of the project record.
5. The Contractor shall log, record and distribute account of below grade, in wall or above ceiling inspections as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up.
6. No closure or covering of work shall proceed until all requirements are met and approval given by the QA/QC Inspection Team where such inspections are to be conducted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014200

REFERENCES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Abbreviations and Acronyms.
B. Definitions
C. Reference Standards.

1.3 ABBREVIATIONS AND ACRONYMS

- A. The following list of common abbreviations are referenced in individual specification sections. This list is provided for convenience to the Contractor and is not intended to define all abbreviations use in the Contract Documents.

1. Abbreviations for contract and specifications.

| | |
|-------------|--|
| CM | Construction Manager |
| EPA | United States Environmental Protection Agency |
| HVAC | Heating, ventilating, and air conditioning |
| IAQ | Indoor Air Quality |
| IEQ | Indoor Environmental Quality |
| MEPA | Massachusetts Environmental Protection Agency |
| MGL | Commonwealth of Massachusetts General Laws |
| MSDS | Material Safety Data Sheet |
| NIC | Not in Contract |
| OFCI | Owner Furnished, Contractor Installed |
| OFI or OFOI | Owner Furnished and Installed (Owner Furnished, Owner Installed) |
| VOC | Volatile Organic Compounds |

2. Abbreviations for measurements and quantities.

| | |
|-------------|------------------------|
| C | Celsius |
| cm | Centimeter |
| F | Fahrenheit |
| Hrs | Hours |
| Kg | Kilogram |
| L | Liter |
| M | meter |
| m^2 or SM | square meter |
| m^3 or CM | cubic meter |
| mm | Millimeter |
| Mths | Months |
| psi | Pounds per square inch |
| t | ton |

1.4 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract including, but not limited to, the following:

1. The Designer (the Architect-of-Record or Engineer-of-Record as applicable).
2. The Owner.
3. The General Contractor.

B. Definitions for terms utilized in the Contract Documents:

1. "As necessary," "as directed," "when directed," "satisfactory," "good and sufficient," "approved," or other general qualifying terms are used on the Drawings: These terms are deemed to be followed by the words, "in the opinion of the Designer," or "by the Designer," as the case may be."
2. "Addenda": written or graphic instruments issued prior to the execution of the Contract which modify or interpret the Bidding Documents, including the Drawings and Specifications, by additions, deletions, clarifications or corrections.
3. "Approval," "approved," "approved equal," "or equal," or "other approved" means as approved by the Designer."
4. The terms "Contractor", "General Contractor", and "Construction Manager" as used in the Project Manual have the same meaning and are interchangeable in Contract Documents. These terms refer to the same entity.
5. The term "Trade Contractor:" A subcontractor for designated portions of work as defined by MGL Title 11, Chapter 149A, Section 8, which require a regulated

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

selection process.

6. The term "Day": is defined as the following:
 - a. The term "calendar day" is a full 24-hour period, starting from 12 AM (midnight), and includes all weekends and legal holidays.
 - b. The term "working day" shall mean any calendar day except Saturdays, Sundays, and legal holidays at the place of the building.
 - c. Where the term "day" is used without the adjective of "calendar" or "working", it shall mean "calendar day".
7. The terms "Designer", "Architect", and "Architect/Engineer" as used in the Project Manual have the same meaning and are interchangeable in Contract Documents. These terms refer to the same entity.
8. "Reviewed": When used to convey Designer's action on General Contractor's submittals, applications, and requests, "reviewed" is limited to Designer's duties and responsibilities as stated in the Conditions of the Contract.
9. "Directed": A command or instruction by Designer. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
10. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
11. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
12. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
13. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
14. "Furnish and Install" or "Provide": items identified shall be furnished and installed under this Contract. The term "Furnish", when used separately, shall mean that the items referred to shall be furnished, only. Similarly, the term "install", when used separately, shall mean that the items referred to shall be installed, only.
15. "Knowledge," "recognize" and "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill and diligence required by the Contract Documents. Analogously, the expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a Contractor familiar with the Project and exercising the care, skill and diligence required of the con-

tractor by the Contract Documents.

16. "Not in Contract" or "N.I.C.": equipment, furnishings, or other materials not included as a part of this Contract.
17. "Product": materials, systems and equipment.
18. "Project Site": Space available for performing construction activities subject to Owner approval. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.5 REFERENCE STANDARDS

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Where reference is made in the Contractual Documents to Publications and Standards issued by Associations or Societies, the intent shall be understood to specify the current edition of such Publications or Standards (including tentative revision) in effect on the date of the contract advertisement notwithstanding any reference to a particular date.
- C. Obtain copies of standards when required by Contract Documents.
- D. Should specified reference standards conflict with Contract Documents, request clarification from Designer before proceeding.
- E. The contractual relationship to the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.
- F. Schedule of References
 1. Listed below are abbreviations for the names and titles of trade association names, federal government agencies and similar organizations which are referenced in the individual specification sections. The addresses and URL's (Uniform Resource Locators) provided are for the Contractor's convenience and are believed to be current and accurate, however addresses and URL's frequently change, and no assurance is made on their accuracy:

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| AA | Aluminum Association 900 19th Street N.W., Suite 300 Washington, DC 20006 www.aluminum.com |
| ABAA | Air Barrier Association of America 1600 Boston-Providence Highway Walpole, MA 02081 www.airbarrier.org |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

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| AAMA | American Architectural Manufacturer's Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org |
| AATCC | American Association of Textile Chemists and Colorists PO Box 12215, 1 Davis Drive, Research Triangle Park, NC 27709- 2215 www.aatcc.org |
| ACI | American Concrete Institute, International 38800 Country Club Drive, Farmington Hills, Michigan 48331 www.aci-int.org |
| ACPA | American Concrete Pipe Association 222 West Las Colinas Boulevard, Suite 641, Irving TX www.concrete-pipe.org |
| ADC | Air Diffusion Council 104 S. Michigan Ave, Suite 1500, Chicago, IL 60603 www.flexibleduct.org |
| AFPA | American Forest & Paper Association (Formerly NFPA National Forest Products Association) 1111 19 th St. N.W., Suite 800, Washington, DC 20036 www.afandpa.org |
| AGA | American Gas Association Inc. 1515 Wilson Blvd. Arlington, VA 22209-2469 www.agagas.com |
| AGAI | American Galvanizers Association Inc. 12200 E.Lliff Ave, Suite 204, Aurora, CO 80014-1252 www.galvanizeit.org |
| AIA | American Institute of Architects 1735 New York Avenue, N.W., Washington, DC 20006-5292 www.aia.org |
| AIHA | American Industrial Hygiene Association 2700 Prosperity Ave, Suite 250, Fairfax VA 22031 www.aiha.org |
| AISC | American Institute of Steel Construction 1 E. Wacker Dr., Suite 3100, Chicago, IL 60601-2001 www.aisc.org |
| AMCA | Air Movement and Control Association 30 W. University Drive, Arlington Heights, IL 60004-1893 www.amca.org |
| ANSI | American National Standards Institute 11 W. 42 nd Street, 13 Floor, New York, NY 10036 www.ansi.org |
| APA | APA - The Engineered Wood Association (formerly APA - American Plywood Association) |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

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| | P.O. Box 11700, Tacoma, WA 98411-0070 www.apawood.org |
| ARI | Air-Conditioning and Refrigeration Institute 4301 N. Fairfax Dr., Suite 425, Arlington, VA 22203 www.ari.org |
| ASCA | Architectural Spray Coaters Association 230 West Wells Street, Suite 311, Milwaukee WI 53203 www.aecinfo.com |
| ASCE | American Society of Civil Engineers 1015 15 th St. N.W., Washington, DC 20005 www.asce.org |
| ASHRAE | American Society of Heating, Refrigerating, and Air-Conditioning Engineers 1791 Tullie Circle NE, Atlanta GA.30329 www.ashrae.org |
| ASME | American Society of Mechanical Engineers 345 East 47th Street, New York, NY 10017-2392 www.asme.org |
| ASTM | American Society for Testing and Materials 100 Barr Harbor Drive, West Conshohocken, PA 19428 www.astm.org |
| AWI | Architectural Woodwork Institute 46179 Westlake Drive, Suite 120, Potomac Falls, VA 20165 www.awin.org |
| AWMAC | Architectural Woodwork Manufacturers Association of Canada Unit 02A 4803 Centre St. NW, Calgary, Alberta, Canada www.awmac.com |
| AWPA | American Wood Preservers' Association P.O. Box 286, Woodstock, MD 21163-0286 www.awpa.com |
| AWPI | American Wood Preservers' Institution 1945 Old Gallows Rd., Suite 150, Vienna, VA 22182 www.oas.org |
| AWS | American Welding Society 550 LeJeune Road, N.W., Miami, FL 33126 www.aws.org |
| BHMA | Builders Hardware Manufacturers Association, Inc. 355 Lexington Ave., 17 Floor New York, NY 10017 www.buildershardware.com |
| BIA | Brick Industry Association 11490 Commerce Park Drive, Reston, VA 22091-1525 www.bia.org |

Project Number 21.926301.00
 Pedestrian Safety & Traffic Circulation Improvements Project
 Dracut Public Schools
 Town of Dracut, Massachusetts

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| CSA | Canadian Standards Assoc. International, Forest Products Group Sussex Centre, Suite 402, 90 Burnhamthorpe Road West, Mississauga, Ontario, Canada www.csa.ca |
| CDA | Copper Development Association 260 Madison Ave., 16 th Floor, New York, NY 10016 www.copper.org |
| CISCA | Ceilings & Interior Systems Construction Association 579 W. North Ave., Suite 301, Elmhurst, IL 60126 www.cisca.org |
| CRI | Carpet and Rug Institute 310 Holiday Ave, Dalton, GA 30720 www.carpet-rug.com |
| CRSI | Concrete Reinforcing Steel Institute 933 N. Plum Grove Road, Schaumburg, IL 60173-4758 www.crsi.org |
| CPSC | Consumer Product Safety Commission 5401 Westbard Ave., Bethesda, MD 20816-1469 www.cpsc.gov |
| CTIOA | Ceramic Tile Institute of America 12061 W.Jefferson BLVD, Culver City, CA 90230-6219 www.ctioa.org |
| DHI | Door and Hardware Institute 14170 Newbrook Dr., Chantilly, VA 22021-2223 www.dhi.org |
| FM | Factory Mutual Engineering & Research Corp. 1151 Boston-Providence Turnpike Norwood, MA 02062 www.fmglobal.com |
| GA | Gypsum Association 6525 Belcrest Road, Suite 480, Hyattsville, MD 20782 www.gypsum.org |
| GANA | Glass Association of North America 2945 S.W. Wanamaker Dr., Suite A, Topeka, KS 66612-5321 www.glass.org |
| GICC | Glazing Industry Code Committee 3310 Harrison St., Topeka, KS 66611-2279 www.glazingcodes.net |
| IGCC | Insulating Glass Certification Council 3933 US Route 11, PO Box 2040, Cortland, NY 13045 www.igcc.org |
| IPA | Industrial Perforators Association |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

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| | | 710 N. Plankinton Ave., Suit 622 Milwaukee, WI 53203 www.iperf.org |
| ILI | | Indiana Limestone Institute of America, Inc. Stone City Bank Building, Suite 400, Bedford, IN 47421 www.iliai.com |
| IPCI | | International Polished Concrete Institute Norris TN www.ipcaonline.org |
| LSGA | | Laminators Safety Glass Association 3310 Harrison Street, Topeka KS 66611-2279 www.glass.org |
| MCAA | | Mason Contractors Association of America 1910 S. Highland Ave. Suite 101, Lombard, IL 60148 www.masoncontractors.org |
| MFMA | | Maple Flooring Manufacturers Association 60 Revere Drive, Suite 500, Northbrook, IL 60062 www.maplefloor.org |
| MIA | | Marble Institute of America, Inc. 33505 State Street, Farmington, MI 48335 www.marble-institute.com |
| MIL | | Military Specifications and Standards Naval Publications and Forms Center 5801 Tabor Avenue, Philadelphia, PA 19120 www.milspec.com |
| NAAMM | | National Association of Architectural Metal Manufacturers 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603 www.naamm.org |
| NCMA | | National Concrete Masonry Association 2302 Horse Pen Road, Herndon, VA 20171-3499 www.ncma.org |
| NEBB | | National Environmental Balancing Bureau 8575 Government Circle, Gaithersburg, MD 20877-4121 www.nebb.org |
| NEMA | | National Electrical Manufacturers' Association 1300 N. 17 th St., Suite 1846, Rosslyn, VA 22209 www.nema.org |
| NFPA | | National Fire Protection Association 1 Battery March Park, PO Box 9101, Quincy, MA 02269 www.nfpa.org |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

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| NFRC | National Fenestration Rating Council 6305 Ivy Lane, Greenbelt MD 20770 www.nfrc.org |
| NOFMA | National Oak Flooring Manufacturers Association, Inc. PO Box 3009, Memphis, TN 38173-0009 www.nofma.org |
| NRCA | National Roofing Contractors Association 10255 W. Higgins Road, Suite 600, Rosemont, IL 60018-5607 www.nrca.net |
| NSF | NSF International 789 N. Dixboro Road, PO Box 130140. Ann Arbor, MI 48105 www.nsf.org <i>(formerly National Sanitation Foundation)</i> |
| NTMA | National Terrazzo and Mosaic Association 110 E. Market St., Suite 200A, Leesburg, VA 20176 www.ntma.com |
| PCA | Portland Cement Association 5420 Old Orchard Road, Skokie, IL 60077-1083 www.cement.org |
| PEI | Porcelain Enamel Institute 4004 Hillsboro Pike, Suite 224B, Nashville, TN 37215 www.porcelainenamel.com |
| PS | Product Standard U. S. Department of Commerce www.omg.org |
| SDI | Steel Deck Institute P.O. Box 25, Fox River Grove, IL 60021-0025 www.sdi.org |
| SDI | Steel Door Institute 30200 Detroit Road, Cleveland, OH 44145-1967 www.steeldoor.org |
| SEI | Structural Engineering Institute of the American Society of Civil Engineers 1801 Alexander Bell Drive Reston VA 20191 www.seinstitute.org |
| SGCC | Safety Glass Certification Council RMS, P.O. Box 9 Henderson Harbor, NY 13651 www.sgcc.org |
| SIGMA | Sealed Insulating Glass Manufacturers Association 401 N. Michigan Ave., Suite 2400, Chicago, IL 60611 www.glasschange.com |
| SJI | Steel Joist Institute |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

3127 10th Ave. N., Myrtle Beach, SC 29577
www.steeljoist.org

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| SMACNA | Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Dr., Chantilly, VA 22022-1209 www.smacnapa.org |
| SPIB | Southern Pine Inspection Bureau 4709 Scenic Highway, Pensacola, FL 32504-9094 www.spib.org |
| SSMA | Steel Stud Manufacturer's Association 8 South Michigan Avenue, Chicago IL 60603 www.ssma.com |
| SSPC | The Society for Protective Coatings 40 24 th Street, 6 th Floor, Pittsburgh PA 15222-4623 www.sspc.org |
| SWRI | Sealant, Waterproofing & Restoration Institute 2841 Main Street, Suite 585, Kansas City, MO 64108 www.swrionline.org |
| TCNA | Tile Council of North America, Inc. 100 Clemson Research Blvd., Anderson, SC 29625 www.tileusa.com (formerly TCA, <i>Tile Council of America</i>) |
| TMS | The Masonry Society 3970 Broadway, Suite 201D, Boulder CO 80304 www.masonrysociety.org |
| UL | Underwriters' Laboratories, Inc. 333 Pfingston Road, Northbrook, IL 60602 www.ul.com |
| WDMA | Window & Door Manufacturers Association (formerly National Wood Window & Door Association, NWWDA) 205 E. Touhy Avenue, Suite G-54, Des Plaines, IL 60018 www.nwwda.org |
| WI | Woodwork Institute PO Box 980247 West Sacramento, CA 95798 www.woodworkinstitute.com |

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014325

TESTING AGENCY SERVICES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Awarding Authority will engage an independent testing agency at its own expense to perform certain testing, to confirm compliance with contract requirements and criteria described in the various Specification Sections and as the Owner deems appropriate. It is the Contractor's responsibility to provide and pay for its own inspection and testing. See Section 014000. The contractor will be responsible for scheduling both the owners and their own testing agency.
- B. Refer also the list of testing below, and to individual Specification Sections for the types and frequency of testing to be performed by Awarding Authority's independent testing laboratory.

1.3 RELATED SECTIONS

A. **GENERAL CONDITIONS**

1. Inspections and testing required by laws, ordinances, rules, regulations, or orders of public authorities.

B. **Section 014000 – QUALITY REQUIREMENTS**

1. Contractor's responsibility for testing services to maintain quality control.

1.4 TESTING AGENCY SERVICES

A. Testing agency services may include, but not be limited to, the following:

1. Soils; in-place and fill.
2. Paving.
3. Loam and seed.
4. Concrete.

- B. Each independent inspection and testing agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the Commonwealth of Massachusetts.

1.5 ENGAGEMENT OF INDEPENDENT TESTING LABORATORY

- A. Awarding Authority will engage and pay for the services of independent inspectors and an independent testing laboratory to perform the services specified under various Sections of the Specifications.
- B. The services of a testing laboratory as specified in this Section is intended for the Owner's verification of the Contractor's compliance with the requirements of the Contract Documents. This shall in no way relieve the Contractor of its responsibilities to provide its own quality control, to meet all requirements of the Contract and to provide a completed project free from construction defects.
- C. Services and quantities of testing as specified herein are approximate and may vary. Actual services and quantities of testing will be determined by the Owner and the Designer during the construction period.
- D. Locations for taking sample specimens for testing shall be as directed by the Owner and the Designer-of-Record.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to the work and to fabricator's facilities as required for the performance of their testing. Schedule testing agencies that need to perform duties in a timely fashion.
- B. Provide Casual Labor and Facilities:
 - 1. To provide access to the work to be inspected or tested.
 - 2. To obtain and handle specimens at the site.
 - 3. To facilitate inspections and tests.
 - 4. To construct a storage box, on the site, of sufficient size to store cylinders which will afford protection required by ASTM C31.
- C. Shop Drawings: Provide a complete set of construction documents and shop and/or erection drawings for the items being inspected and tested.
- D. Samples:
 - 1. Provide the laboratory with preliminary representative samples of materials to be tested, in requested quantities.
 - 2. When the source, quality, or characteristic of an approved source changes or indicates lack of compliance with contract requirements, submit additional samples of materials to testing laboratory.
- E. Miscellaneous Reports, Lists: When requested by the Designer or testing laboratory, the Contractor shall immediately provide copies of mill reports, cutting lists, shipping bills, material bills, time and place of shipment of materials to shop and field, and any relevant data on pressure testing and investigations of materials.

F. Notification:

1. To facilitate the timely sequence of inspection and testing, the Contractor shall give advanced notification to the testing laboratory and the Designer that work has progressed to the point where inspection and testing may proceed.
2. Advanced notification shall be 48 business hours (minimum) prior to commencement of activity requiring testing and inspection.

1.7 CONTRACTOR'S QUALITY CONTROL

- A. Services of testing laboratory retained by Awarding Authority is for verification of Contractor's compliance and, if such tests or inspection indicates failure to comply with these Contract Documents, the Contractor shall bear all costs associated with additional testing and inspection after the work has been corrected, to verify compliance.
- B. Provide a Quality Control Program, to the Owner and the Designer for their approval that includes monitoring and enforcement of the quality programs of all Trade Contractors and subcontractors. Refer to Section 014000 Quality Requirements.

1.8 PATCHING

- A. Areas where samples are taken for purposes of testing shall be patched by the Contractor to the satisfaction of the Owner and the Designer-of-Record.

1.9 REPORTING OF RESULTS

- A. The testing laboratory shall document the values obtained in all tests and shall indicate degree of compliance with the requirements of the Contract Documents. Test reports shall include the following information:
 1. Designer's project name and number.
 2. Type and location of test sample and time and date obtained.
 3. Type of test, ASTM or other appropriate designation.
 4. Result of test and degree of compliance with Contract Documents.
- B. Testing laboratory shall, on a weekly basis, distribute results of all tests as follows:
 1. Owner – 1 copy
 2. Designer – 1 copy
 3. Consulting Engineers (as designated by the Designer) – 1 copy
 4. Contractor – 1 copy
 5. Trade Contractor – 1 copy
- C. Notify all parties immediately in the event that test results indicate that strengths, re-

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

quired by the Contract Documents, will not be attained.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 REQUIREMENTS INCLUDED

- A. Temporary Facilities and Controls including the following:
1. Maintenance of Access.
 2. Dust Control.
 3. Noise Control.
 4. Cleaning During Construction.
 5. Field Offices.
 6. Sanitary Facilities.
 7. First Aid and Fire Extinguishers.
 8. Construction Barriers.
 9. Parking.
 10. Debris Control and Removal.
 11. Safety Protection.
 12. Vehicle and Equipment Protection.
 13. Shoring.
 14. Delivery of Materials.
 15. Shut Down Notice.
 16. Excavations and Field Survey Requirements.
 17. Fire Prevention Measures.
 18. Removal of Temporary Utilities, Controls and Facilities.

1.3 MAINTENANCE OF ACCESS

- A. The Contractor shall provide and maintain for the duration of his contract, a means of access to, around and within the site, as indicated on the Contract Drawings, for vehicular

traffic and authorized personnel. This means of access shall be construed to sustain the weight of equipment customarily engaged for use in construction projects of this type and magnitude. The Contractor shall, without additional compensation from the Owner, furnish labor and materials as may be required from time to time to maintain this means of access in an acceptable condition as determined by the Designer. Pedestrian access shall provide adequate protection against falling debris, slippage, adequate lighting, warning and directional signs, and protection against construction activities.

1.4 DUST CONTROL

- A. The Contractor shall have all Subcontractors provide adequate means for the purpose of preventing dust caused by construction operations from creating a hazard, nuisance, and from entering adjacent occupied areas throughout the period of the construction contract.
- B. This provision does not supersede any specific requirements for methods of construction or applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the Contractor.

1.5 NOISE CONTROL

- A. Work must be scheduled and performed in such a manner as to not interfere with the operations of the Owner. Construction work that is deemed by the Owner to be excessively noisy may be required to be done during non- normal working hours and at no additional expense to the Owner.
- B. Comply with requirements of authorities having jurisdiction. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.
- C. Execute construction work by methods and by use of equipment which will reduce excess noise.
 1. Equip air compressors with silencers, and power equipment with mufflers.
 2. Manage vehicular traffic and scheduling to reduce noise.
 3. No heavy equipment may be started or idled before 7A.M.

1.6 EROSION AND SEDIMENT CONTROL

- A. General: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, and requirements specified in Division 31 – EARTHWORK and as specified herein. The more stringent requirements shall apply.
 1. Obtain all required permits from authorities having jurisdiction regarding erosion control and silt fence.
 2. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

- B. Erosion and sediment control: Provide an erosion and sediment control program for minimizing erosion and siltation during the term of construction. The following minimum erosion control principles shall apply to the land grading and construction phases:
 1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - a. Stripping of vegetation, grading, or other soil disturbance shall done in a manner which will minimize amount of bare soil exposed at one time. Whenever feasible, natural vegetation shall be retained and protected.
 - b. Erosion control devices shall be installed as early as possible in the construction sequence prior to start of clearing and grubbing operations and excavation work.
 - c. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
 2. Sediment shall be retained on-site. Temporary erosion protection shall be accomplished by covering land with erosion protection materials, as appropriate for prevailing conditions.
 - a. Use baled hay or straw to trap sediment and prevent sediment from clogging drainage systems. Handle baled units in manner to prevent from breaking apart.
 - b. Locate baled hay or straw where required and as directed by the Designer and stake bales to prevent overturning, flotation, or displacement.
 - c. Remove deposited sediment periodically.
 - d. Temporary seeding, mulching, or other suitable stabilization measures, shall be used to protect exposed critical areas during prolonged construction or other land disturbance, where the period of exposure will be greater than two (2) months.
 3. Drainage provisions shall accommodate increased runoff resulting from modifications of soil and surface conditions during and after development or disturbance. Such provisions shall be in addition to existing requirements.
 - a. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 4. Cut and fill slopes and stockpiled materials shall be protected to prevent erosion. Slopes shall be protected with permanent erosion protection when erosion exposure period is expected to be greater than or equal to six months, and temporary erosion protection when erosion exposure period is expected to be less than six months.
 - a. Except where specified slope is indicated on Drawings, fill slopes shall be limited to a grade of 2:1 (horizontal:vertical) cut slopes shall be limited to a grade of 1-1/2:1.
 - b. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

5. Inspect and adjust erosion and sediment control devices twice each month and after each heavy rain. Remove silt if greater than 6 inches deep. Replace damaged or deteriorated items devices.
 - a. Hay bales shall be inspected frequently and maintained or replaced as required to maintain both their effectiveness and essentially their original condition. Underside of bales shall be kept in close contact with the earth below at all times, as required to prevent water from washing beneath bales.
 - b. Sediment deposits shall be disposed to off-site, in a location and manner which will not cause sediment nuisance elsewhere.

1.7 CLEANING DURING CONSTRUCTION

- A. Unless otherwise specified under the various Sections of the Specifications, the Contractor shall perform clean-up operations during construction.
- B. Control accumulation of waste materials and rubbish; periodically dispose of off- site in a legal manner. The Contractor shall bear all costs, including fees resulting from such disposal.
- C. Clean interior areas prior to start of finish work and maintain areas free of dust and other contaminants during finish operations.
- D. Maintain project in accordance with all local, State, and Federal Regulatory Requirements.
- E. Store volatile wastes in covered metal containers and remove from premises.
- F. Prevent accumulation of wastes which create hazardous conditions.
- G. Provide adequate ventilation during use of volatile or noxious substances.
- H. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 1. Do not burn or bury rubbish and waste materials on site.
 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 3. Do not dispose of wastes into streams or waterways.
 4. Identify potential sources of cleaning water runoff and propose abatement procedures.
- I. Use only those materials which will not create hazards to health or property and which will not damage surfaces.
- J. Use only those cleaning materials and methods recommended by manufacturer of surface

materials to be cleaned.

- K. Execute cleaning to ensure that the buildings, the sites, and adjacent properties are maintained free from accumulations of waste materials and rubbish and windblown debris, resulting from construction operations.
- L. Provide on-site containers for collection of waste materials, debris, and rubbish.
- M. Remove waste materials, debris and rubbish form the site periodically and dispose of at legal disposal dump site (DEP approved).
- N. Handle material in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
- O. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not damage surrounding surfaces.

1.8 FIELD OFFICES

- A. The Contractor shall provide and maintain temporary field offices.
- B. The Contractor shall provide a suitable field office on site for its own use. The location shall be at the discretion of Dracut Public Schools.

1.9 SANITARY FACILITIES

- A. The Contractor shall provide suitable toilet facilities for its staff and the Resident Engineer(s) and the Designer.
- B. Sanitary facilities: Provide self-contained single-occupant chemical toilet units, wash facilities and drinking water fixtures, and in quantities required by OSHA regulations.
 - 1. Existing facilities located in school buildings may not be used by the Contractor's personnel.
 - 2. Locate sanitary facilities within the fenced construction zone.
 - 3. Permanent facilities located in completed work may not be used by the Contractor's personnel.
 - 4. Chemical toilets and their maintenance shall meet requirements of state and local health regulations and ordinances and shall be subject to the approval the Resident Engineer and Designer.
 - 5. Upon completion of new toilet facilities, the Awarding Authority's Project Manager may at its discretion, designate a specific toilet area to be used for the Contractor and Trade Contractors engaged in the Work. However, Contractor shall take responsibility

for maintenance and cleaning of such areas and shall leave them in first class condition equal to the accepted conditions of toilet facilities not used for construction personnel.

1.10 FIRST AID AND FIRE EXTINGUISHERS

- A. First aid supplies: Comply with governing regulations.
- B. Fire extinguishers: Provide and maintain on site, adequate fire extinguishers UL rated for A-B-C type fires. Provide red-painted plywood standards for each extinguisher. Additionally, provide a dry chemical fire extinguisher at each location where welding, torch cutting, and other similar hazardous work is in progress.
 - 1. At welding and heat cutting work: Provide not less than a Multi-purpose dry chemical type (mono ammonium phosphate) fire extinguisher, 20-pound capacity, multi-purpose rated "2A, 120 B:C".

1.11 CONSTRUCTION BARRIERS

- A. Proper construction barriers shall be provided around the contract work areas as defined by the Contract Drawings or as directed by the Resident Engineer.
- B. Construction barriers shall consist of traffic cones, ribbons, tapes, secure fencing, trench covers, wood barriers, warning signs, directional signs, and other traffic materials to keep traffic and people from area of construction and maintain ongoing operations.
- C. Barriers shall be erected at such approved locations as are necessary, sufficiently cross-braced and supported adequately from floors and ceilings as required.

1.12 PARKING

- A. Parking: Parking spaces on Campus are very limited and the school will not provide designated parking lot spaces near the construction site for the Contractor's use. The Contractor will be required to pay all fees for parking. The Contractor shall state his/her parking and staging area requirements during the Pre-construction Meeting. The area(s) for materials storage will then be agreed to between the Contractor and Owner. The limits of material storage will be delineated by the Contractor with construction fencing and enforced throughout the Contract.

1.13 DEBRIS CONTROL AND REMOVAL

- A. Debris shall not be permitted to accumulate or migrate, and the work shall at all times be kept satisfactorily clean. Facility trash receptors shall not be used for the disposal of debris. Dumpster shall be provided by the Contractor for removal of debris for all Subcontractors.
- B. Remove debris from the work site on a daily basis and dispose of same at any (private or

public) DEP approved dump that the Contractor may choose providing that the Contractor shall make all arrangements and obtain all approvals and permits necessary from the owner or officials in charge of such dumps. Proposed dump site shall be submitted to be approved by Designer and Owner prior to start of demolition. During disposal process, copies of daily receipts from dumpsite shall be submitted on a regular basis.

1.14 SAFETY PROTECTION

- A. At no time shall the work be left unattended without proper safety protection and shall not be left unprotected to the weather and accessible to the public. It is the responsibility of the Contractor to maintain proper safety protection for the public while work is in progress or unattended.

1.15 VEHICLE AND EQUIPMENT PROTECTION

- A. All construction activities shall be performed in such a manner so as not to dust, stain or damage any building elements, equipment, vehicles, etc. within general vicinity of the construction work area. Any damage to these items shall be cleaned and repaired at the expense of the Contractor.
 - 1. All construction vehicles and equipment on site shall be effectively disabled and secured when not in use.

1.16 SHORING

- A. The Subcontractors shall provide all temporary shoring and bracing as required for the proposed work. Comply with all applicable codes and standards.

1.17 DELIVERY OF MATERIALS

- A. All Materials shall be delivered to the Contractor's or Trade Contractor's Manager's warehouse or may be delivered to the site if the Contractor's representative is present to receive them.
- B. No materials will be received by Dracut Public School personnel, either on site or at the school's shipping and receiving dock.

1.18 SHUT DOWN NOTICE

- A. The Contractor shall notify the Designer and Owner at least fourteen (14) Working Days in advance, of the need for school personnel to shut down or modify any utilities or building systems. If, due to school emergencies or staffing shortages the Contractor shall reschedule their work at no cost to the Awarding Authority.

1.19 EXCAVATIONS AND FIELD SURVEY REQUIREMENTS

- A. Prior to the backfill of any underground utility, the Contractor shall notify the Resident Engineer(s), 24 hours prior to any such activity. The Contractor shall provide all survey services required for the work, including establishing and reestablishing construction control, resetting of stakes and monuments and performing surveys needed for restoration of public and private improvements and monumentation that have been damaged, destroyed or relocated by the Contractor.
- B. The Awarding Authority and Owner reserve the right to request Survey Field data and as-built field data on an as needed basis during the construction contract and at no additional cost to the Awarding Authority.
- C. All site and utility work, including as-built documentation, shall incorporate the use of NAD83 and NAVD88 datum's Massachusetts's coordinate system mainland zone. The Contractor shall deliver a comma delineated as-built file or files designating each individual utility being as-built. Each point as-built shall have five fields, point number, northing, easting, elevation and descriptor.

1.20 FIRE PREVENTION MEASURES

- A. Prior to commencement of work at the site, the Owner's Representative, Contractor, and Contractor shall meet with the Local Fire Marshal to plan site and building access in the event of fire.
 1. Access paths for heavy firefighting equipment shall be laid out and maintained.
 2. Free access from streets to fire hydrants and to outside connections for standpipes, sprinklers or other fire extinguishing equipment shall be provided and maintained.
- B. The Contractor shall take all necessary precautions for the prevention of fire during construction. Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes. Ascertain and comply with requirements of Project insurance carrier, local fire department and the state fire marshal.
 1. Maintain the area within contract limits orderly and clean.
 - a. Remove combustible rubbish promptly from the site and when required, store combustible materials in containers in fire-safe locations.
 2. Maintain clear access to exits from within the building.
 3. Smoking is not permitted in the building or adjacent areas.
- C. Establish procedures for fire protection for welding, cutting and open torch work, and other potentially hazardous operations. Obtain permission from local authorities having jurisdiction for such work as required by law. Provide special fire extinguishers at welding and torch cutting work.

1. After Owner occupancy or partial occupancy: Maintain a fire watch when fire protection and warning systems have been temporarily de-activated. Maintain watch during all working hours for full period of de-activation.
 2. The Contractor will assign personnel to inspect all construction areas at the end of each day's work for fire hazards prior to lock-up.
- D. Provide for outside storage of gas tanks, sufficiently clear of any structure. Promptly remove welding and cutting equipment from the building when no longer required. Do not store welding or cutting materials within the building when work is not being performed.
- E. Permanent fire protection system may be activated to meet these requirements. Replace fusible link heads and other expended or discharged components at time of Substantial Completion.

1.21 REMOVAL OF TEMPORARY UTILITIES, CONTROLS, AND FACILITIES

- A. Remove temporary materials and construction prior to Substantial Completion.
 1. Do not remove erosion control devices until after all disturbed earth has been paved or vegetated.
- B. Remove underground work and compacted materials to a depth of 2 feet; fill and grade site as specified.
- C. Restore existing facilities used during construction to original conditions. Restore permanent facilities used during construction to specified condition.
- D. Clean and repair damage caused by installation or use of temporary work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015726

SITE WATERING FOR DUST CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Materials.
2. Construction methods.

- B. The work to be done under this Section consists of furnishing all materials, labor, tools and equipment, and performing all operations necessary to complete all calcium chloride applications for dust control.

- C. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. CALCIUM CHLORIDE shall conform to AASHTO Standard Specification M 144, Type I or Type II. The calcium chloride shall be packaged in moisture proof bags or in airtight drums with the manufacturer, name of product, net weight, and percentage of calcium chloride guaranteed by the manufacturer legibly marked on each container.
- B. Calcium chloride failing to meet the requirements of the aforementioned specifications or that which has become caked or sticky during shipment may be rejected by the Engineer.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Calcium chloride shall be applied when ordered by the Engineer or Owner and only in areas which will not be adversely affected by the application.
- B. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard or at any other rate as directed by the Engineer. Application shall be by means of a mechanical spreader, or other approved methods. The number and frequency of applications shall be determined by the Engineer.
- C. Care shall be taken to avoid application of calcium chloride on any paved surfaces. If calcium chloride is applied to paved surfaces, the affected surfaces shall be immediately cleaned of all calcium chloride.

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Definition of terms
 2. Basic product requirements
 3. Recycled content of materials
 4. Regional materials
 5. Owner furnished products
 6. Product delivery and handling requirements
 7. Product storage and protection requirements
 8. Manufacturer's instructions
 9. Construction waste management/Disposal of undesirable materials.
 10. Installation
 11. Standard products and substitutions
 12. Guarantees
- B. All equipment, materials, instruments, or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents.
- C. Materials and equipment to be incorporated in the work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the work, and they shall be delivered as nearly as feasible in the order required for executing the work.
- D. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 DEFINITION OF TERMS

- A. "Products" is defined as new material, machinery, components, equipment, fixtures, and systems used in the Work. Products do not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for re-use.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. "Materials" are products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- C. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
- D. "Fasteners" include all products required for mechanical connections and include, but are not limited to: nails, screws, bolts, expansion bolts, chemical bolts, epoxy anchors, pins, powder-actuated devices, and similar fasteners, anchors, and connections.
- E. Definitions in this article are not intended to negate the meaning of other terms used in Contract Documents, including "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction", and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

1.4 BASIC PRODUCT REQUIREMENTS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Where possible utilize materials harvested and manufactured regionally, within a 500-mile radius of the project site. Refer to Regional Materials Article herein this Section.
 - 2. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- B. To the fullest extent possible, provide products of the same kind, from a single source.
- C. Provide interchangeable components of the same manufacturer, for similar components.
- D. When the Contractor has the option of selecting two or more products, ensure that products selected shall be compatible with products previously installed or approved.
- E. Provide all products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- F. Galvanic Corrosion: Install materials in manner which will effectively isolate dissimilar metals which may potential for galvanic corrosion. Use non-absorptive dielectric material, isolation coatings, or other protective isolator approved by Architect.
- G. Fasteners, Anchors, and Connections: Provide all fasteners, anchors, and connections needed to safely, securely, and appropriately secure all Work permanently in place.
 - 1. General: The Contractor is solely responsible for the capacity, suitability, adequacy, and safety of all welded, fastened and anchored connections.
 - a. Comply with applicable code requirements regarding fastener selection and installation.

- b. Provide at least two fasteners for each individual item being fastened.
- c. Utilize fastener manufacturer's published load tables for working loads to assist in determining fastener size and space. Do not use ultimate load capacity in determining fastener selections.
- d. Provide a minimum safety factor of 4.
- e. Select and utilize fasteners having minimum galvanic corrosion factor.
- f. Hydrogen embrittlement prevention:
 - 1) Do not use high-strength and low-alloy fasteners which have been subjected to an acid pre-treatment (because they can become brittle and fail), utilize instead equivalent capacity and size bi-metal, stainless steel or high strength aluminum fasteners, as appropriate to the conditions and materials where being used.
 - 2) Utilize low-hydrogen electrodes for welding high-strength steels to prevent hydrogen embrittlement.
2. To permit the Contractor control over means and methods, some fastener conditions may not be fully defined in the Contract Documents. In particular, individual specification sections that require delegated independent engineering. In such instances the Contractor is fully responsible to determine method of fastening appropriate for each condition. The Contractor shall take into consideration substrate material(s) and product(s) being fastened, live and dead loading, and both atmospheric and visual exposure considerations. Contractor is responsible to determine fastener type, material, finish, size, diameter, length and spacing.
3. Torque structural fasteners as recommended by fastener manufacturer, or as otherwise specified in the Contract Documents.

H. Permanent Labels and Nameplates:

1. Restrictions:
 - a. Do not provide exposed-to-view labels, nameplates, or trademarks which are not required by code, or regulations.
 - b. Do not expose manufacturers, suppliers, or installer's name, logo, or trade names on normally visible surfaces.
 - c. Do not provide labels, nameplates or trademarks when individual specification sections specifically exclude them.
 - d. All exposed-to-view advertising and name-brand labels shall be fully removed without damage to substrate finish.
2. Location for required labels: Required labels, approval plates and stamps shall be located on a concealed surface, or where required for observation after installation on accessible non-conspicuous surface.
3. Data Plates: Provide permanent data plate on each item of service-connected or power-operated equipment.
 - a. Data Plate Information: Include manufacturer, model, serial number, date of manufacture, capacity, ratings, power requirements, and all other similar

- essential data.
- b. Locate data plates on easily accessible surface that is inconspicuous in occupied spaces.
- I. General: Prohibit the use of or incorporation into the work of materials which contain toxic, hazardous and harmful materials.

1.6 PRODUCT DELIVERY AND HANDLING REQUIREMENTS

- A. General: Refer to the Contract and General Conditions and Specifications Sections for requirements pertaining to transportation and handling of materials and equipment.
- B. Transport and handle products in accordance with manufacturer's instructions and as specified in individual specification sections.
 - 1. Packing: Arrange for the return of packing materials, such as wood pallets, where economically feasible.
 - 2. Ductwork: All ductwork shall be sealed from time of manufacture, with seals intact upon delivery to construction site, and remain so, until ready for installation. Contractor is jointly responsible with HVAC&R subcontractor to ensure ducts are properly sealed and maintained.
 - a. Store ductwork in clean dry conditions and keep sealed while it is stored.
- C. Packaging: Deliver materials in recyclable or in reusable packaging such as cardboard, wood, paper, or reusable blankets, which will be reclaimed by supplier or manufacturer for recycling.
 - 1. General: Minimize packaging materials to maximum extent possible while still ensuring protection of materials during delivery, storage, and handling.
 - a. Unacceptable Packaging Materials: Polyurethane, polyisocyanurate, polystyrene, polyethylene, and similar plastic materials such as "foam" plastics and "shrink-fit" plastics.
 - b. Reusable Blankets: Deliver and store materials in reusable blankets and mats reclaimed by manufacturers or suppliers for reuse where program exists or where program can be developed for such reuse.
 - 1) Non-returnable containers should be donated to local and community organizations to the greatest extent possible to reduce quantity of disposed materials.
 - c. Pallets: Where pallets are used, suppliers shall be responsible to ensure pallets are removed from site for reuse or for recycling.
 - d. Corrugated Cardboard and Paper: Where paper products are used, recycle as part of construction waste management recycling program, or return to material's manufacturer for use by manufacturer or supplier.
 - e. Sealants, Paint, Primers, Adhesives, and Coating Containers: Return to supplier

- or manufacturer for reuse where such program is available.
- 2. Purchase materials in bulk where possible. Take measures to avoid individual packaging for volume purchases.
 - D. Schedule deliveries to avoid delays in installation of products, to minimize long-term storage, to prevent overcrowding of construction spaces and to limit potential damage to stored materials. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
 - E. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
 - F. Provide equipment and personnel to handle and store products by methods to prevent soiling, disfigurement, or damage.

1.7 STORAGE AND PROTECTION

- A. All materials and equipment at the job site that are to be incorporated in the contract work and that are the responsibility of the Contractor, shall be adequately stored and protected from damage until completion of the contract work.
- B. The Contractor shall be responsible for protecting all materials and equipment furnished by him and for protecting materials and equipment for the contract work which are furnished by the Owner or Others. Responsibility shall be vested in the Contractor for materials and equipment furnished by the Owner when they have been delivered to the job site by the transporting vehicle. The Contractor shall report in writing to the Owner, within 24 hours after receipt at the job site of the materials and equipment, whether there is any shortage or damage. Unless specified otherwise in these specifications, responsibility shall be vested in the Contractor for materials and equipment furnished by Others when such items are ready to be incorporated in or connected to the work of the Contractor.
- C. The Contractor shall be responsible for all damage to any of the work covered by the Contract Documents before the final acceptance of the work.
- D. Any materials, equipment, instruments, or devices of whatever kind which may have become damaged or deteriorated from any cause, shall be removed and replaced by good and satisfactory items at the Contractor's expense for both labor and materials.
- E. In general, equipment and materials awaiting installation shall be stored on a dry base at least six inches above ground or floor and shall be properly covered and secured to prevent damage from wind, rain, snow, or flooding. Equipment with moving parts and/or subject to moisture damage such as electrical and instrumentation devices, motors, etc., shall be stored in a dry, heated enclosure, and in accordance with the manufacturer's recommendations.
- F. All equipment shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- G. Moving parts on stored equipment shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment and operate it at least half load once each week for an adequate period of time so as to ensure that the equipment does not deteriorate from lack of use.
- H. Lubricants shall be changed upon completion of installation and as frequently as required thereafter, according to manufacturer's recommendations, during the period between installation and final acceptance. New lubricants, oil, grease, etc., shall be put into the equipment at the time of acceptance.
- I. Prior to the Owner's acceptance of equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by a long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested, and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.
- J. General: Refer to the Contract and General Conditions and Specifications Sections for requirements pertaining to storage and protection of materials and equipment.
- K. Store and protect products in accordance with manufacturer's instructions and as specified in individual specification sections.
 - 1. Provide all necessary equipment and personnel to store products by methods to prevent soiling, disfigurement and damage.
 - 2. Avoid excessive material handling and potential product damage, locate storage areas convenient to work areas.
 - 3. Store and protect products with seals and labels intact and legible.
 - 4. Store and handle materials in a manner as to prevent loss from weather and other damage.
- L. For exterior storage of fabricated products, place on sloped supports, above ground.
- M. Provide off-site storage and protection when site does not permit on-site storage or protection.
 - 1. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
 - 2. Store sensitive products in weather-tight, climate-controlled enclosures.
 - 3. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Store loose granular materials on solid flat surfaces in a well-drained area; prevent mixing with foreign matter.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to assure

products are undamaged and are maintained under specified conditions.

- P. Store heavy materials in locations and in a manner that will not damage or disfigure existing, or new construction.

1.9 MANUFACTURER'S INSTRUCTIONS

- A. When work is specified to comply with manufacturers' instructions, submit copies as specified in Section 013300 - SUBMITTAL PROCEDURES, distribute copies to persons involved, and maintain one set in field office.
- B. Perform work in accordance with details of instructions and specified requirements.

1.10 CONSTRUCTION WASTE MANAGEMENT/DISPOSAL OF UNDESIRABLE MATERIALS

- A. Source separation: Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in order to prevent contamination of materials and to maximize recyclability and salvaging of identified materials.
- B. Return: Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.
- C. Reuse and Salvage: Set aside, sort, and protect separated products and materials for collection, re-use by Owner, as designed for re-use on-site or designated for salvage by Owner's separate waste recycling contractor.
- D. Recycling: Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- E. All unsuitable and waste materials shall be disposed of, off the Owner's property in approved locations, in accordance with all rules, regulations, and ordinances governing such disposal, at no cost to the Owner. All excess materials that are not the property of the Contractor shall be disposed as directed by the Owner, and all excess materials belonging to the Contractor shall be removed from the Owner's property. Unsuitable, waste, excess, or other undesirable material shall not be disposed of in a manner so as to become a nuisance to other property users or owners, shall not be disposed of so as to cause a health hazard or ecological damage, and shall not be disposed of so as to cause an eyesore to the public.
- F. All excess fill is the property of the Owner. It is the Contractor's responsibility to contact the Owner to determine whether or not the Owner wishes to retain possession of the excess fill and where it shall be hauled to. If the Owner does not wish to retain possession of any or all of the fill, it shall be the Contractor's responsibility to dispose of it in a legally approved and acceptable manner, at no cost to the Owner.

1.11 INSTALLATION

- A. All materials and equipment shall be installed in accordance with the recommendations of the manufacturer and in accordance with the requirements of these specifications, to perform properly in the completed contract work, and to the satisfaction of the Owner and the Engineer.
- B. All systems shall be completed and left in working order by the Contractor. All requirements of the Owner and the Engineer shall be satisfied by the Contractor.
- C. The Contractor shall obtain written installation manuals from the equipment manufacturer prior to installation. A copy of all installation instructions shall be furnished to the Engineer's field representative at least one week prior to installation of the equipment.
- D. The contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or mechanic who shall represent the manufacturer and provide help and guidance at the project site during installation of the equipment. For equipment such as pumping units, which require field alignment and connections, the Contractor shall provide the services of the manufacturer's qualified mechanic, millwright, or machinist to align the pump and motor prior to making piping connections or anchoring the pump base.

1.12 STANDARD PRODUCTS AND SUBSTITUTIONS

- A. Unless otherwise mentioned in these specifications or shown on the drawings, the materials, fixtures, and equipment to be furnished for the contract work shall be standard products of those manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All materials, fixtures, and equipment shall comply with the requirements of these specifications and shall be suitable for proper performance in the completed contract work.
- B. No request for substitutions will be considered after submission of proposals except for written emergency request made because of no availability of specified items, delay in delivery, or to adjust to unforeseen field conditions. The written emergency request for substitutions shall be accompanied with a photocopy of the letters from the supplier and manufacturer stating the reasons that they are unable to furnish the specified materials. No substitutions for those items mentioned in these specifications or shown on the plans shall be incorporated in the finished work unless written approval is received from the Engineer before purchase of those items and at least thirty days prior to the scheduled time the item is to be incorporated in the work.
- C. Whenever in the Plans and Specifications any item of equipment or material is designated by reference to a particular brand, manufacturer, or trade name, it is understood that an approved equal product, acceptable to the Engineer and the Owner, may be substituted by the bidder or Contractor. The Engineer shall be the sole judge of whether a substituted product is equal to the specified product. In the event of acceptance of any alternate or substitution, it shall be the responsibility of the Contractor to coordinate such alternate or substitute items with all other items to be furnished to assure the proper fitting together of all items. Any additional cost incident to the coordination and/or fitting together of alternate or substitute items shall be borne by the Contractor at no extra cost to the Owner. Similar responsibility applies to items which are left to the Contractor's option.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1.13 TIME OF DELIVERY

- A. The Contractor shall notify all manufacturers or suppliers of materials, equipment, machinery, motors, etc., that they shall be required to state and guarantee a firm delivery date for all equipment which they offer to furnish. Delivery dates shall be as required by the Contractor to meet the approved progress schedule.

1.14 GUARANTEES

- A. All equipment shall be guaranteed in accordance with the requirements of the General Conditions of these Specifications. Guarantee requirements may be added to or modified in the detailed equipment specifications in other sections of these Specifications.

PART 1 - PRODUCTS (Not Used)

PART 2 - PRODUCTS (Not Used)

END OF SECTION

SECTION 017400
PROTECTION, CARE & RESTORATION OF PROPERTY & UTILITIES

PART 1 - GENERAL

- 1.1 Excavating machinery, loaders, graders, and all other heavy equipment shall be operated with care to prevent damage to trees, shrubs, and man-made improvements. Where required, trees and utility poles within or adjacent to the work site shall be protected and braced by suitable means. Only those trees that are in direct physical interference with the work may, with the approval of the Town, be removed.
- 1.2 All cutting of branches, limbs, trunks, and roots shall be done according to the Tree/Shrub Protection Plan with consultation and direct supervision of a licensed arborist. The pruning shall be neatly done without splitting or crushing. In case of cutting or unavoidable damage to branches, limbs, and trunks of trees, the cut or damaged portions shall be neatly trimmed to minimize water penetration and pest intrusion.
- 1.3 At the beginning of the planting season that follows the original seeding of permanent grass, the seeded areas shall be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at their own expense.
- 1.4 Cultivated hedges, shrubs, and plants, which may be impacted by the Contractor's operation, shall be protected by suitable means, or shall be dug up and temporarily replanted and maintained and, if required, replaced.
- 1.5 All lawns, driveway entries, paved surfaces, roadways, and structures which have been damaged by the contractor's operations shall be restored to a new condition at the expense of the Contractor.
- 1.6 The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the project.
- 1.7 Existing utilities, public and private, shall be protected and maintained as needed and as indicated on the Contract Drawings. Contractor shall notify the Town and private utilities prior to working in an area of the project where existing utilities may be impacted by the Contractor's operations. Any existing utilities impacted by the Contractor's negligence or lack of standard care shall be repaired to the satisfaction of the utility owner or replaced if repair will not meet "as new" conditions.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

- A. Closeout of incomplete work (punch list) requirements.
- B. Landscape repairs.
- C. Project Record Documents.
- D. As-Built Drawings.
- E. Operating and Maintenance Requirements
- F. Closeout Requirements and Submittals.
- G. Conferences occurring after Substantial Completion.

1.3 PUNCH LIST REQUIREMENTS AND PROCEDURES

A. Definitions:

- 1. Contractor's Punch List: Complete list of incomplete and incorrect Work prepared by the Contractor prior to request of Designer's inspection for Certification of Substantial Completion. As a minimum the List shall include the following information for each work item:
 - a. Clear identification of each incomplete work item, including all subcontractor's work.
 - b. Estimated value of each incomplete work item.
 - c. A short statement of why work is not complete.
 - d. Identify subcontract responsibility, as appropriate to each item.
- 2. Designer's Punch List: A list of incomplete and incorrect Work prepared by the

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

Designer, which modifies the Contractor's Punch List, following review and acceptance of the Contractor's Punch List.

- B. Pre-Closeout requirements: Prior to requesting initial Designer's inspection for Certification of Substantial Completion, submit to the Designer a full and complete list of all incomplete work items (Contractor's Punch List).
- C. Punch list procedures at Substantial Completion:
 - 1. Designer will review submitted Contractor's Punch List and determine whether it is suitable to proceed with the Substantial Completion Process.
 - a. If the Designer determines that the amount of completed work is insufficient to be considered for Substantial Completion, the Designer will not proceed with the Punch List process until sufficient completion of the Project is achieved.
 - b. The Designer will review the Contractor's Punch List and if the Designer determines that it does not reflect proper identification of the incomplete and incorrect work, he/she will request a revision and resubmission of the Contractor's Punch List.
 - c. If the Designer determines that the amount of work indicated on the Contractor's Punch List is excessive, the Designer will suspend its review until the scope of work identified in the Contractor's Punch List is reduced to a level satisfactory to the Designer.
 - d. When the Designer reviews and accepts the Contractor's Punch List as being an accurate reflection of incomplete and incorrect work; the Designer will prepare and issue to the Contractor the "Designer's Punch List".
 - 1) The "Designer's Punch List" will be based on the Contractor's Punch List with modifications and additions as may be required.
 - 2) The "Designer's Punch List" includes work which must be completed and corrected prior to final completion.
 - 2. Upon receipt of the "Designer's Punch List", the Contractor shall immediately distribute the list to all subcontractors.
- D. Completion of Punch List Work: Make reasonable efforts to ensure that all "Designer's Punch List" items are completed or corrected within 14 calendar days from the date of the Designer's Punch List" or within the Contract Time, whichever comes first.
- E. Designer's Final Inspection and review of Punch List Work:
 - 1. After Contractor certification that all Punch List Work has been properly completed the Designer will then perform the Final Inspection.
 - a. Incomplete Items: If the Designer discovers any incomplete or incorrect "Designer's Punch List" items or any other deficiency in the work, the Designer will prepare a "Revised Punch List" which may also include other incomplete Contract requirements such as record documents, owner's operation and maintenance manuals, warranties, and other Contract

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

requirements. Designer's site reviews of the Work for this "Revised Punch List" and any subsequent revised Punch Lists shall be performed as additional service to Owner, back-charged to the Contractor.

- b. The Designer may assign a dollar value for each item of incomplete or incorrect work remaining.

F. Additional Inspections and related additional services fee: The Designer and the Designer's consultants will provide two site inspections, one at Substantial Completion, and one to confirm that the "Designer's Punch List" has been completed.

1. "Revised Punch List: If the Designer prepares and issues a "Revised Punch List: because of the Contractor's failure to complete the Work, then the Owner shall compensate the Designer and the Designer's consultants for their additional services and additional inspections. The payment for additional services and inspections will be back-charged to Contractor. The Owner will deduct the amount of the Designer's additional services fee from final payment to the Contractor by Change Order.

1.4 LANDSCAPE REPAIRS

A. All lawn areas used for contractor parking and material storage shall have the topsoil removed, the subsoil shall be loosened to 12" below finished grade, the topsoil shall be replaced and amended with a complete, slow release fertilizer, proof rolled and seeded with a restoration seem mix consisting of:

| PURE SEED | GERM. |
|--------------------------------------|-------|
| 34.72% KENTUCKY BLUE GRASS 85/80 | 95% |
| 24.68% CREEPING RED FESCUE | 85% |
| 19.82% OMEGA III PERENNIAL RYE GRASS | 95% |
| 19.78% SATURN PERENNIAL RYEGRASS | 95% |

B. All lawn areas damaged by pedestrian or vehicular traffic due to the contractor's operations shall be aerated. Aeration shall consist of 9"-10" deep infraction at areas free of tree roots and at areas within tree drip lines shall be aerated 1"-3" with a tow behind 3- point hitch aerator. If in the opinion of the Landscape Designer, the lawn areas require over-seeding or restoration, the following seed mixture shall be used at a rate to be determined:

| PURE SEED | GERM |
|--------------------------------------|------|
| 34.72% KENTUCKY BLUE GRASS 85/80 | 95% |
| 24.68% CREEPING RED FESCUE | 85% |
| 19.82% OMEGA III PERENNIAL RYE GRASS | 95% |
| 19.78% SATURN PERENNIAL RYEGRASS | 95% |

1.5 PROJECT RECORD DOCUMENTS

- A. General: Record documents shall reflect actual “as-built” condition and the products installed. Include all changes and deviations from original Contract Documents, and incorporate information from:
 - 1. Original Contract Documents
 - 2. Addenda
 - 3. Change orders
 - 4. Construction change directives
 - 5. Field directives, and instructions from the Owner, Architect or regulatory authorities having jurisdiction
- B. Project Record Documents shall include products, systems and equipment which have been incorporated into the Work. Do not include generic manufacturers information, or information for equipment and materials which were not incorporated as part of the Work. Record Documents shall include, but are not limited to:
 - 1. Record Project Manual
 - 2. Project record drawings (as built drawings)
 - 3. Final Site Survey
 - 4. Operation and maintenance data, preventive maintenance instructions
 - 5. Materials and finishes manual
 - 6. Product warranties and bonds
 - 7. Maintenance contracts
 - 8. Record of all test reports and inspections
 - 9. Wall charts and data such as valve diagrams, electrical panel board directories, and similar information
- C. Labeling and identification of Record Documents
 - 1. Clearly label all record documents with name of Project and the words “Record Document”.
 - 2. Date progressive entries of information as appropriate.
 - 3. Date Record Documents with the final submission date.

1.6 AS-BUILT DRAWINGS

- A. As-built Drawings shall consist of all the Contract Drawings. As-built Drawings shall be kept up-to-date. Information from on-going Work shall be recorded on As-built Drawings within 48 hours of Work being performed.
- B. The Contractor and each Trade Contractor shall be required to maintain one set of As-built Drawings, as the work relates to their Sections of the Specifications, at the site.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. The As-built Drawings shall be stored and maintained in the Contractor's field office apart from other documents used for construction. The As-built Drawings shall be maintained in a clean, dry, and legible condition and shall not be used for construction purposes.
- D. As-built Drawings, as submitted by the Contractor shall be verified in the field by the Designer, or his Consultants. Verification by the Designer shall occur during the construction process and prior to the related work being completed and covered up.
- E. The As-built Drawings shall be available at all time for inspection by the Awarding Authority, and Designer. All deficiencies noted shall be promptly corrected.
- F. The following information shall be indicated on the As-Built Drawings:
 - 1. Record all changes, including change orders, in the location, size, number and type both horizontally and vertically of all elements of the project which deviate from those indicated on all the Contract Drawings.
 - 2. The tolerance for the actual location of utilities and appurtenances within the building to be marked on the As-built Drawings shall be plus or minus two (2) inches.
 - 3. The location of all underground utilities and appurtenances referenced to permanent surface improvements, both horizontally and vertically at ten (10) foot intervals and at all changes of direction.
 - 4. The location of all internal utilities and appurtenances, concealed by finish materials, including but not limited to valves, coils, dampers, vents, cleanouts, strainers, pipes, junction boxes, turning vanes, variable and constant volume boxes, ducts, traps and maintenance devices. The location of these internal utilities, appurtenances, and devices shall be shown by offsets to the column grid lines on the Drawings.
 - 5. Each of the utilities and appurtenances shall be referenced by showing a tag number, area served and function on the As-built Drawings.
- G. At the end of each month and before payment for materials installed, the Contractor, each Trade Contractor, and agents of the Owner shall review As-built Drawings for purpose of payment.
 - 1. If the changes in location of all installed elements are not shown on the As-Built Drawings and verified in the field, then the material shall not be considered as installed, and payment will be withheld.
- H. Prior to the installation of all finish materials, a review of the As-built Drawings shall be made to confirm that all changes have been recorded. All costs to investigate such conditions shall be borne by the applicable party as determined by the Designer.
- I. At the completion of the contract, each Trade Contractor shall submit to the Contractor a complete set of his respective As-built Drawings indicating all changes.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Submit As-Built Drawings for review by Designer prior to Date of Project Substantial Completion.
 - a. After checking the above drawings, the Contractor shall certify in writing on the title sheet of the drawings that they are complete and correct and shall submit the As-built Drawings to the Designer.
 - b. As-Built Drawings shall be submitted electronically to the Designer, in a format which can be added to the complete plans as constructed.
- J. The Designer will review As-Built Drawings and shall verify by letter to the Awarding Authority that the work is accurate and copy Owner. The Contractor shall incorporate all changes on the original drawings; thus, creating Record Drawings. The Designer shall submit to the Awarding Authority, electronic files in Autocad format with two (2) sets of prints to be used for the final inspection of the project. Inaccuracies in As-built Drawings, as determined by the Designer and the Awarding Authority, may be grounds for postponement of the final inspection or delay the processing of final payment until such inaccuracies are corrected by the Contractor.
 1. Submit FINAL As-Built Documents to the Awarding Authority within 30 calendar days from Date of Project Substantial Completion

1.7 OPERATING AND MAINTENANCE REQUIREMENTS

- A. General: Prepare data in the form of an instructional manual. Furnish manuals which contain all of the following groups of equipment:
 1. Special equipment and systems.
 2. Fire protection system.
 3. Utilities and plumbing systems.
 4. Electrical systems.
- B. Standards:
 1. Measurements: Provide all measurements in U.S. standard units such as feet and inches, pounds, and cfm; provide additional measurements in the "International System of Units" (SI).
 2. Abbreviations: Provide complete nomenclature of all parts of all equipment; include part numbers of all replaceable parts.
- C. Schedule: At least three weeks (21 Calendar Days) prior to the time of turning over this contract to the Operating Agency for Use and Occupancy, or Final Acceptance, the Contractor shall secure and deliver to Designer, three (3) complete, indexed files and three (3) CD or DVD copies, containing approved operating and maintenance manuals, shop drawings, and other data.
 1. A copy will be returned after final inspection with Designer's comments; Revise and resubmit all volumes to Awarding Authority within 30 Calendar days.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. Furnish bound and properly identified Manuals prior to request for Final Acceptance.
1. Manuals shall be in 8-1/2 by 11-inch pages and bound in three "D ring" capacity binders with durable plastic covers. Internally subdivide the binder contents with permanent page dividers.
 - a. Arrange content by section number and systems, process flow, under section numbers and sequence as listed in the Table of Contents of this Project Manual.
 - b. Drawings: Preferable 11 inches in height bound in with text with reinforced punched binder tab. Fold drawings larger than 8-1/2 by 11 inches to size of text pages. Provide a drawing pocket for Drawings larger than 11 by 17 inches; locate pocket inside rear cover or bound in with text.
 2. Each manual shall include the same following minimum information:
 - a. Table of Contents.
 - b. Directory of Contractor, Trade Contractors, subcontractors, and major equipment vendors listing addresses, phone numbers and appropriate emergency phone numbers.
 - 1) Include local sources of supplies and replacement parts.
 - c. Directory of Architect and consultants listing addresses and phone numbers.
 - d. Operation and maintenance instructions. Provide schematic diagrams of control systems, circuit directories for each electric panel and charts showing the tagging of all valves.
 - e. Air and water test and balancing reports.
 - f. Maintenance and cleaning instructions for finishes.
 - g. Product and manufacturer's Certificates.
 - h. Photocopies of all extended warranties and bonds.
 3. Edit Manufacturer's information to limit operation and maintenance information for systems products and components which have been incorporated into the Work. Do not include information for systems, products, and components which are not incorporated as part of the Work.

1.8 CLOSEOUT REQUIREMENTS AND SUBMITTALS

- A. Procedural Requirements Prior to Use and Occupancy: Punch List:
1. During the finishing stages of the project, the Contractor shall make frequent inspections with Subcontractors, the Designer, and the Resident Engineer, so as to progressively check for and correct faulty work.
 2. During the course of construction of the project, the Contractor shall procure and maintain test records and certificates that will be required prior to issuance of the Department of Public Safety (DPS) Certificate of Occupancy.
 3. When the Contractor determines that he/she is Substantially Complete*, he/she shall

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

prepare for submission to the Designer a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with contract Documents. The Contractor's list shall be accompanied with certificates that will be required as prerequisites for applying for a DPS inspection.

- a. *NOTE: Substantially Complete means that less than one percent (1%) of all contract work, including change orders, remains to be done, and that none of the remaining work will affect health, safety, or function.
- 4. Upon receipt of the Contractor's list of items to be completed or corrected, the Designer will promptly make a thorough inspection, together with the Owner, and prepare a "punch list", setting forth in accurate detail any items on the Contractor's list and additional items that are not acceptable.
- 5. The Contractor shall immediately correct all punch list items that affect health, safety or function (as determined by the Designer, completion of which is required before issuance of a Certificate of Use and Occupancy).
- 6. Upon receipt of the Certificate of Use and Occupancy, and its adjunct monetized punch list, the Contractor shall cause the completion of all of the other punch list items within the timeframe required by said certificate, but not more than 45 calendar days if the timeframe is not indicated on the said certificate.

1.9 CONFERENCES AFTER SUBSTANTIAL COMPLETION

- A. The Owner reserves the right to call for conferences commencing with the date of Substantial Completion and continuing for one year thereafter, for purposes of inspecting the Work and to plan correction of any deficiencies or failures discovered during this period.
 - 1. Attendance is required by Contractor's Project Manager, Designer, Owner and each applicator, installer, and supplier as the Owner may direct or the Contractor may wish to have present. All representatives attending such meetings shall be the same persons, or shall have the same powers and authority, as those attending progress meetings occurring prior to the Date of Substantial Completion.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 1. Record Drawings.
- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 RECORD DRAWINGS

- A. Record drawings shall be maintained and stored by the Contractor separately from other documents used during construction. Record drawings shall be kept in a clean, dry, and legible condition and shall not be used for construction purposes.
- B. Record drawings shall be available for inspection by the Engineer and Owner at all times. All deficiencies identified shall be promptly corrected.
- C. Record Drawings shall comply with the following:
 1. Record all changes of all elements of the project deviating from those indicated on the Contract Drawings. Include change orders and changes in location, size, number and type of both horizontal and vertical elements installed.
 2. Record locations of all horizontal and vertical changes in direction of buried utilities with respect to permanent above-grade features.
 3. Record locations of all facilities installed within buried structures.
- D. Record Specifications: Submit one paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- F. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.
- G. Before payment for materials installed is made, the Engineer and Owner reserve the right to review the record drawings to-date. If changes in location of all installed elements are not shown on the record drawings and verified in the field, the material may not be considered as installed and payment may be withheld by the Owner.
- H. Prior to the installation of all finish materials, the Engineer and Owner may review the record drawings to confirm that all changes have been recorded. The cost of investigating such conditions shall be the responsibility of the applicable party as determined by the Engineer.
- I. Subcontractors shall submit to the General Contractor a complete set of record drawings showing their respective work indicating all changes. The General Contractor shall certify in writing on the title sheet of the drawings that they are complete and correct and shall submit the record drawings to the Engineer.
- J. The Engineer shall review the record drawings and shall verify in writing to the Owner that the work is accurate. Inaccuracies in record drawings, as determined by the Owner, may be grounds for postponement of the final inspection until such accuracies are corrected.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 019000 PERMITS

PART 1 – GENERAL

1.1 CONTRACT DOCUMENTS

- A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. The Contract Documents shall govern the work covered in all parts of these specifications.
- B. The owner shall be responsible for identifying and obtaining all federal, state and local environmental permits required by the nature and location of construction except as noted below. To the extent possible, such permits shall be obtained prior to the solicitation of bids for construction and copies of all permits so obtained shall be included below in this section of these specifications. The status of the application on each permit, including the conditions thereof, not obtained prior to the solicitation of bids shall also be indicated below. The contractor shall obtain insurance as necessary to enable the owner to obtain the necessary permits.
- C. The Contractor shall be responsible for obtaining all building and other permits required of his equipment, excavation, electrical, work force or particular operations (such as blasting or local Street opening permits) in the performance of the contract.

1.2 MASSACHUSETTS DEP – WETLANDS PERMITTING

- A. Request for Determination of Applicability (RDA) is pending with the Conservation Commission to determine if the wetland and buffer delineation lines and the amount of disturbance in that buffer does or does not need a permit.
- B. In anticipation of determination, a Notice of Intent (NOI) for the Mass Wetlands Protection Act for impacts to a wetland buffer is in process to expedite the issuing of an Order of Conditions (OOC) as the “permit” for the project.

1.3 EPA CONSTRUCTION DEWATERING DISCHARGE PERMIT

- A. The CONTRACTOR will be required to file a Notice of Intent and comply with all federal, state and local regulations concerning water quality and discharge monitoring for any excavation dewatering. This permit is the responsibility of the CONTRACTOR.

1.4 EPA/NPDES STORMWATER PERMIT (NOTICE OF INTENT)

- A. The Contractor and Owner are required to obtain a Construction General Permit for Stormwater Discharges from Construction Activities from the EPA (NPDES General Permit) if the area of construction disturbance equals or exceeds one acre (43,560 square

feet). The Contractor (on behalf of the Owner) must file a Notice of Intent (NOI) with the Stormwater Pollution Prevention Plan (SWPPP) prior to the start of construction and a Notice of Termination (NOT) after completion of the project.

1.5 ISSUANCE OF PERMIT(S)

- A. After completion of all information on permit form(s).
- B. Upon receipt of a bond and insurance in the correct amounts.
- C. Payment of fees as required by Public Works Director. Permit form must be signed by the Highway Foreman, or their designee, before it becomes valid.

1.6 EMERGENCY PERMIT & UTILITY NOTIFICATION

- A. Nothing in this manual shall be construed to prevent the making of such excavations, as may be necessary, for the preservation of life or property; or for the location of trouble in conduit or pipe; or for making repairs, provided that the person making such excavation shall apply to the Town for such a permit on the first working day after such work is commenced. Before any excavation work is started, the person or utility excavating must contact "Dig-Safe" and the Town Water and Sewer Division for 'on spot' locations.

1.7 REVOCATION OF PERMIT(S)

- A. Any permit, issued by the Town of Dracut, may be revoked immediately upon written notification to the permittee.

1.8 DISPLAY OF PERMIT(S)

- A. A copy of the permit shall be at the job site at all times for inspection by local police, public works personnel and other interested persons. To be valid, the permit must show the effective and expiration dates and must be signed by the Highway Foreman , or their designee. This regulation will also apply to public utilities and their sub-contractors.

1.9 EXTENSION OF TIME

- A. All required work shall be completed prior to September 1st, 2022 in a manner satisfactory to the Town or before the expiration date shown on the permit, except in cases where permanent repairs, such as pavement wearing course or loam and seeding must be made at a future date. Otherwise, the permit holder shall submit a written request to the Town for an extension of time, stating the reasons for the request. The Town reserves the right to grant or to reject the request, in writing, to the Contractor.

1.10 IDEMNIFICATION

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. The applicant agrees, as a condition governing the issuance of a permit, that they will hold harmless the Town of Dracut, the Public Works Director and their agents and employees from any and all claims and actions whatsoever arising from the experience of said permit.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 023219

EXPLORATORY EXCAVATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. Scheduling.
 2. Excavation.
 3. Backfill and restoration.
- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.
- C. Exploratory excavation shall be performed using tight control machinery supplemented by hand labor to determine the location of underground structures and utilities.
- D. Damage to existing structures and utilities shall be avoided. Repairs to any damages caused during excavation shall be replaced by the Contractor at no additional cost and to the satisfaction of the Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEUDLING

- A. Coordinate excavation schedule with the Engineer and Owner.
- B. Obtain information on the location of existing underground structures and utilities prior to excavation.

3.2 EXCAVATION

- A. The Contractor shall assume that existing utilities are live and shall conduct all excavations with extreme care and caution so as not to damage existing structures or utilities. Immediately notify the Engineer and the utility owner if damage occurs.
- B. Make repairs to damaged structures and utilities promptly.

3.3 BACKFILL AND RESTORATION

- A. Exploratory excavations shall be backfilled, and the surface restored in accordance with the Contract Documents in kind or as directed by the Engineer.

END OF SECTION

SECTION 024100

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Demolition and removal of selected site elements and as required for new work. Refer to the Drawings for additional requirements.
2. Salvage of existing items to be reused or turned over to the facility.
3. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be relocated, reused, or turned over to the facility, all existing removed materials, items, trash and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at her/his expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted.
4. Demolition and removal work shall properly prepare for alteration work and new construction to be provided under the Contract.
5. Scheduling and sequencing operations without interrupting utilities serving occupied areas. If interruption is required, obtain written permission from the utility company and the responsible client representative. Schedule interruption when the least amount of inconvenience will result and coordinate removal and relocation with affected trades.
6. Removal of the designated items, including pavement, curbing, bollards, gravels, structures, etc.
7. Temporary removal, storage, and preparation for the reinstallation of the designated components to remain.

- B. Alternates: Not Applicable.

- C. Items To Be Installed Only: Not Applicable.

- D. Items To Be Furnished Only: Not Applicable.

- E. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 023219 – Exploratory Excavation
2. Section 260534 - Conduit

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

3. Section 311000 – Site Clearing for the excavating and removal of existing pavement, utility structures and lines, appurtenances, and other elements indicated on the Drawings.
4. Section 312000 – Earth Moving for the excavation and utility work.
5. Section 312200 – Earthwork
6. Section 312295 – Support of Excavation
7. Section 312319 – Dewatering
8. Section 312500 – Erosion and Sedimentation Controls for containment of the surrounding areas.
9. Section 321123 – Aggregate Base Course
10. Section 321216 – Asphalt Paving
11. Section 321613 – Granite Curb
12. Section 329119 – Landscaping
13. Section 333913 – Manholes, Frames and Covers
14. Section 334100 – Storm Drainage Piping
15. Section 334413 – Catch Basins

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to the Owner ready for reuse, at a location designated by the Owner. Protect from weather until accepted by the Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques, antiques, and other items of interest or value to the client that may be encountered during selective demolition remain property of the Dracut Public Schools or user Agency as applicable. Carefully remove each item or object in a manner to prevent damage and deliver promptly to a location acceptable to the Owner's representative.

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain in service including means of egress from those buildings.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with early and late starting and finishing dates for each activity. Ensure the Owner's on-site operations are uninterrupted if applicable.
 2. Temporary Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
- C. Predemolition Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces, adjacent buildings, structures and foundations that might be misconstrued as damage caused by selective demolition operations. Comply with Division 01. Submit before Work begins.
- D. Project specific safety plan and job hazard analysis for work being performed.
- E. Project Closeout Submittals:
 - i. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged, and turned over to the Owner.

1.6 QUALITY ASSURANCE

- A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work. The Contractor shall visit the site and examine the existing conditions as he finds them and shall inform herself/himself of the character, extent and type of demolition and removal work to be performed. Submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.
- B. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site to comply with requirements listed within DIVISION 01. Review methods and procedures related to selective demolition including, but not limited to, the following:
 1. Inspect and discuss condition of construction to be selectively demolished.
 2. Review areas where existing construction is to remain and requires protection.

3. Review procedures for noise control and dust control.
4. Review items to be salvaged and returned to Owner.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
 1. Provide not less than 72 hours notice of activities that will affect operations of adjacent occupied buildings.
 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from the Owner and authorities having jurisdiction.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 1. Before selective demolition, Owner will remove the following items:
 - a. None
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.
- F. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.8 GUARANTEE

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.
- B. Contractor's Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace their designated work that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two (2) years from date of Substantial Completion.

1.9 BLASTING

- A. Blasting will not be permitted for this project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Designer.
- E. Engage a professional engineer registered in the Commonwealth of Massachusetts to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
- F. Prior to the demolition of any building element the Contractor shall coordinate with the Engineer to review the temporary shoring and support plan and verify the existing building loading support during the new opening installation.
- G. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- H. Survey of Existing Conditions: Record existing conditions by use of preconstruction videotapes.
 1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- I. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Owner will arrange to shut off indicated services/systems when requested by Contractor. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours notice to occupants of affected buildings if shutdown of service is required during changeover.
 3. Arrange to shut off utilities with utility companies and the Owner.
 4. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
- C. Prior to commencing cutting work in existing surfaces, take all precautionary measures to assure that mechanical and electrical services to the particular area have been made inactive. Coordinate with Fire Protection, Plumbing, HVAC, and Electrical subcontractors. Only licensed tradesmen of that particular trade shall disconnect and cap existing mechanical and electrical items that are to be removed, abandoned and/or relocated.
- D. If, during the process of cutting work, existing utility lines are encountered which are not indicated on the Drawings, regardless of their condition, immediately report such items to the Designer. Do not proceed with work in such areas until instructions are issued by the Designer. Continue work in other areas.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Maintain adequate passage to and from all exits at all times. Before any work is done which significantly alters access or egress patterns, consult with the Designer and obtain approval of code required egress. Under no condition block or interfere with the free flow of people at legally required exits, or in any way alter the required condition of such exits.
- B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
 2. Remove temporary shoring, bracing and structural supports when no longer required.
 3. Post warning signs and place barricades as applicable during placement and removal of temporary shoring.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area(s).

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Provide temporary barricades as required to limit access to demolition areas.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
- D. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

3.4 PROTECTION OF PUBLIC AND PROPERTY

- A. Provide all measures required by federal, state and municipal laws, regulations, and ordinances for the protection of surrounding property, the public, workmen, and Dracut Public Schools' employees during all demolition and removal operations. Measures are to be taken, but not limited to installation of sidewalks, sheds, barricades, fences, warning lights and signs, trash chutes and temporary lighting.
- B. Protect all walks, roads, streets, curbs, pavements, trees and plantings, on and off premises, and bear all costs for correcting such damage as directed by the Designer, and to the satisfaction of the Owner.
- C. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain. Protect adjacent walkways, loading docks, building entries and other building facility during demolition operations. Maintain all exits from existing buildings.
- D. Built Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures. Provide warning and directional signage that is clearly visible. Traffic and Pedestrian Control Plan must be approved by the Owner.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
 8. Provide and maintain in proper condition, suitable fire resistive dust barriers around areas where interior demolition and removal work is in progress. Dust barriers shall prevent the dust migration to adjacent areas. Remove dust barriers upon completion of major demolition and removal in the particular work area.
 9. Protect unaltered portions of existing construction, including finishes, furnishings and equipment.
 10. Provide secure weather protection where demolition has removed a portion of the exterior envelope.
- E. Demolition shall be performed in such a manner that will insure the safety of adjacent property. Protect adjacent property from damage and protect persons occupying adjacent property from injuries which might occur from falling debris or other cause and so as not to cause interference with the use of other portions of the building, of adjacent buildings or the free access and safe passage to and from the same.
- F. Every precaution shall be taken to protect against movement or settlement of the building, of adjacent buildings, structures, sidewalks, roads, streets, curbs and pavements. Provide and place at the Contractor's own expense, all necessary bracing and shoring in connection with demolition and removal work.
- G. Remove portions of structures with care by using tools and methods that will not transfer heavy shocks to existing and adjacent building structures, both internal and external of the particular work area.

3.5 REPAIRS

- A. Promptly repair damage to adjacent buildings and structures caused by demolition operations. Coordinate with Engineer for repair specification.

3.6 DISCOVERY OF HAZARDOUS MATERIALS

- A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work in affected area only and immediately notify the Designer and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Continue work in other areas.
- B. If unmarked containers are discovered during the course of the work, cease work in the affected area only and immediately notify the Designer and the Owner of such discovery. Do not proceed with work in such areas until instructions are issued by the Designer. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.7 CUTTING

- A. Perform all cutting of existing surfaces in a manner which will ensure a minimal difference between the cut area and new materials when patched. Use extreme care when cutting existing surfaces containing concealed utility lines which are indicated to remain and bear full responsibility for repairing or replacement of all such utilities that are accidentally damaged.
- B. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.
- C. Provide fire-safing through all interior penetration walls to seal around new penetrations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Do not allow demolished materials to accumulate on-site.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- D. Burning: Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Premises shall be left in a clean condition and ready to accept alteration work and new construction.

END OF SECTION

SECTION 260534

CONDUIT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Rigid polyvinyl chloride (PVC) conduit.
- B. Conduit fittings.
- C. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 312200 – Earthwork.

1.3 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) ; 2005.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT) ; 2005.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association ; 2010.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); National Electrical Contractors Association ; 2006.
- E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association ; 2007.
- F. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; National Electrical Manufacturers Association ; 2005.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association ; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 1 - Flexible Metal Conduit ; Current Edition, Including All Revisions.
- I. UL 6 - Electrical Rigid Metal Conduit-Steel ; Current Edition, Including All Revisions.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- J. UL 360 - Liquid-Tight Flexible Steel Conduit ; Current Edition, Including All Revisions.
- K. UL 514B - Conduit, Tubing, and Cable Fittings ; Current Edition, Including All Revisions.
- L. UL 797 - Electrical Metallic Tubing-Steel ; Current Edition, Including All Revisions.
- M. UL 886 - Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations ; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 013300 – Submittal Procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
 - 1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
- D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.6 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

2.2 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 1. Pittsburgh Standard Conduit Company.
 2. Republic Steel and Tube
 3. Youngstown Sheet Tube Company
 4. FRE Northeast
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2.4 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil (1.02 mm).
- C. PVC-Coated Fittings:
 - 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 - 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
 - 3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 886 for the classification of the installed location.
 - 4. Material: Use steel or malleable iron.
 - 5. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil (1.02 mm).
- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil (0.38 mm).

2.5 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.7 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.8 FITTINGS

- A. Provide End Bells on all duct bank conduit terminations .
- B. Manufacturer's standard fittings shall be used for raceway supports.
- C. Couplings for rigid metal conduit shall be threaded type.
- D. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".
- E. Couplings, elbows and other fittings used with rigid nonmetallic raceways shall be of the solvent cemented type to secure a waterproof installation.
- F. Acceptable manufacturers:
 1. O.Z.
 2. Crouse Hinds
 3. Appleton
 4. EFCOR
 5. Steel City

2.9 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil (0.51 mm).
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Ductbanks:
 1. A bare 4/0, stranded, soft drawn copper ground cable shall be run above all duct banks and tied into the ground loop in each manhole to form a continuous ground system for the duct banks.
 2. Provide an appropriately sized grounding conductor in all conduits. Bond to ground ring in manholes and at ground bus at termination locations.
- C. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- D. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- E. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- F. Conduit Routing:
 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 2. When conduit destination is indicated and routing is not shown, determine exact routing required.
 3. Conceal all conduits unless specifically indicated to be exposed.
 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across top of parapet walls.
 - d. Across building exterior surfaces.
 6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
 8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 9. Route conduits above water and drain piping where possible.
 10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 11. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
 12. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
 13. Group parallel conduits in the same area together on a common rack.
- G. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
- H. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- I. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty . Include proposed locations of penetrations and methods for sealing with submittals.
 9. Install firestopping to preserve fire resistance rating of partitions and other elements.
- J. Underground Installation:
1. Provide trenching and backfilling in accordance with Section 312200.
 2. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches (610 mm).
 - b. Under Slab on Grade: 12 inches (300 mm) to bottom of slab.
 3. Provide underground warning tape along entire conduit length.
- K. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
1. Secure conduits to prevent floating or movement during pouring of concrete.
- L. Concrete Encasement: Other than ductbanks, where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 3000 with minimum concrete cover of 3 inches (76 mm) on all sides unless otherwise indicated.
- M. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with NFPA 70.
- N. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where conduits are subject to earth movement by settlement or frost.
- O. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- P. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.
- Q. Provide grounding and bonding.

3.3 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- D. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 311000

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Definitions.
2. Material ownership.
3. Informational submittals.
4. Project conditions.
5. Preparation.
6. Temporary erosion and sedimentation control.
7. Tree and plant protection and removal.
8. Clearing and grubbing.
9. Topsoil stripping.
10. Site improvements.
11. Disposal of surplus and waste materials.

- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably

free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

- E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall be offered to the owner prior to become Contractor's property and removed from Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or videotape.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify Dig Safe for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE/SHRUB PROTECTION, RELOCATION, AND REMOVAL

- A. The Owner intends to preserve as many trees as possible, and the Contractor shall comply with all requirements specified herein and set forth by the Owner for the duration of the project. The Owner understands that the removal of some trees may not be avoided due to the nature of the work, however, unapproved and unnecessary removal of trees will not be allowed.
- B. The Contractor shall perform all tree and shrub protection, relocation, and removal in accordance with the recommendations set forth by the Engineer and Owner.

3.4 CLEARING AND GRUBBING

- A. Clearing shall be carefully controlled, including marking of all trees to be removed, with exact clearing limits laid out and approved before any clearing is done. Methods shall ensure against damage to trees designated to remain. The Owner shall make the final decision as to removal of trees, shrubs and other vegetation.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Use only hand methods for grubbing within protection zones.
 - 4. Chip removed tree branches and dispose of off-site.
 - 5. Damaged or scarred trees to remain shall be trimmed of damaged branches and treated with approved wound paint promptly as part of the clearing operations. Trees which are too badly damaged to remain shall be replaced in kind at the Contractor's expense.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth indicated on Drawings in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches .
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 2. Paint cut ends of steel reinforcement in concrete to remain with two (2) coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable material, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property. All suitable excess material that the owner wants to keep shall be stockpiled for the Owner at an approved location.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

**SECTION 311200
DEMOLITION**

PART 1 – GENERAL

1.1 CONTRACT DOCUMENTS

- A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these Specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this Section as for all other parts of these Specifications.

1.2 WORK INCLUDED

- A. This work shall consist of the demolition, removal, and satisfactory disposal of paving, concrete and asphalt sidewalks, roadway and driveway paving, utility structures, foundations, and other obstructions pertaining thereto, as designated on the Plans, as herein specified, and as directed by the ENGINEER.
- B. The work shall also consist of the removal and satisfactory disposal of underground pipes, manholes, etc., as designated on the Plans or encountered during construction.
- C. The work shall also consist of filling and backfilling any resultant pits, holes, or trenches; furnishing and erecting temporary barricades; and cleaning up and rough grading of the affected areas.
- D. This work includes the removal of all obstructions to construction of new facilities encountered during such construction whether or not indicated and/or located on the plans. Every attempt has been made to provide such indication and location but no warranty is made as to the accuracy or completeness of the information provided.

1.3 APPLICABLE STANDARDS

- A. The work in this Section shall be performed in accordance with all applicable provisions of the following technical Reference Standards.

1.4 SUBMITTALS AND CERTIFICATIONS

- A. Submittals and certifications for the following items of work in this Section shall be furnished in accordance with Section 013000, SUBMITTALS.
 1. None required.

1.5 PRODUCTS AND MATERIALS

- A. Not applicable.

1.6 EXECUTION

- A. The method of demolition and removal is left to the discretion of the CONTRACTOR, however, no structures or pipes in use by the Owner shall be damaged or have their proper functioning and operation disturbed by the demolition, nor shall any surrounding structures, homes, or properties suffer any damage.
- B. Drains, curbs, fences, and similar constructions shall be removed as indicated on the Plans or as required and approved for the work. Unless otherwise shown on the Plans, such construction removed for the work shall be restored equal to their original condition to the satisfaction of the ENGINEER.
- C. Existing manholes designated for removal shall be excavated for and removed to a minimum of two (2) feet below finished grade and include removal and plugging of one length of pipe from each line connecting to the manhole. All materials except catch basin and manhole frames and covers, shall become the property of the CONTRACTOR and shall be removed from the site. Catch basin and manhole frames and covers shall be retained by and delivered to the OWNER. Excavations and voids shall be refilled with compacted bank run gravel or suitable fill.
- D. Utility poles located within the construction area shall be removed and replaced, if necessary, by the utility company's forces. Costs for this work shall be paid by the CONTRACTOR. Any work required to reroute existing utility services shall also be done by the utility and paid for by the CONTRACTOR.
- E. All materials resulting from demolition activities shall be disposed of off the OWNER's property in approved locations, in accordance with all rules, regulations, and ordinances governing such disposal.

1.7 INSPECTIONS AND TESTS

- A. None required.

PART 1 – PRODUCTS (Not Used)

PART 2 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 311390

PRE- AND POST-CONSTRUCTION SURVEYS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Pre-construction and post-construction inspection surveys of existing conditions of all building facades, sidewalks, roadways, manholes, surface features, and other structures and facilities within one hundred feet (100') of the proposed Work or as otherwise directed by the Engineer or Owner.
- B. Narrated color videos and captioned photographs of existing conditions, performed by a commercial firm specializing in similar work, to be incorporated into the pre- and post-construction surveys.

1.2 RELATED SECTIONS

- A. Section 013300 – Submittals

1.3 QUALIFICATIONS

- A. Pre- and post-construction building inspections shall be performed by or under the direct supervision of a Professional Engineer, licensed in the Commonwealth of Massachusetts. This individual shall have at least three (3) years of experience in the inspection or design of residential and commercial structures.

1.4 SUBMITTALS

- A. Submit Draft Reports for the pre- and post-construction surveys:

1. Original, plus three (3) copies of the pre-construction survey report for each building, with captioned photographs and narrated videos shall be submitted. The Contractor shall retain one (1) additional copy for their records.
2. Make any changes or corrections to the Draft Report required by the Engineer or Owner.
3. Draft pre-construction survey reports shall be submitted no later than within sixty (60) days of Notice to Proceed and at least fourteen (14) days before any construction-related activity within one hundred feet (100') of a structure or facility designated to be surveyed.

- B. Submit Final Reports for the pre- and post-construction surveys:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. After review, submit five (5) copies of the approved report; four copies and the original. The Contractor shall retain one (1) additional copy for their records. Provide one (1) copy of the report in digital pdf format.

C. Photographs

1. Submit electronic digital image files and two (2) color prints on each 8-1/2 by 11 sheet of paper. Mark prints with name and number of contract, name of Contractor, description, and location of view, and date photographed. Number each print, and provide a sketch indicating where that photo was taken along with a listing of the photo subject corresponding to the photo number.
 2. Photographs will become the property of the Owner, and may not be published without the Owner's written permission.
- D. Prior to performing any photography and video work, submit qualifications of the individual performing the work. Include a list of projects that includes project name; location; date(s); names and current contact information for Owner, Engineer and General Contractor.
- E. Within fifteen (15) days of Notice to Proceed, submit the qualifications and professional resumes of the Registered Professional Engineer(s) that will perform the pre- and post-construction inspection of the buildings.
- F. Submit copies of all videos in DVD format as follows:
1. Six (6) copies of the pre-construction video within sixty (60) days of Notice to Proceed.
 2. Six (6) copies of the post-construction video prior to Substantial Completion.
- G. Submit written release(s) from the photographer, videographer, and photographic studio covering all videos and/or photographs.
- H. Packing and Shipping of Photos and Video
1. Transmit prints in a bound report and on a CD or DVD.
 2. Transmit electronic media on CDs (Photographs) or DVDs (Videos) in standard electronic media mailers marked "Digital Media – Do Not Bend".

1.5 COORDINATION AND SCHEDULING

- A. General post-construction photographs and videos shall be performed between thirty (30) and sixty (60) days prior to Substantial Completion and submitted prior to Substantial Completion.
- B. Post-construction inspection survey work shall not be started until at least thirty (30) days after microtunneling operations pass and all other construction activities are completed within one hundred feet (100') of the structure to be surveyed.
- C. Dates for other photography and video recording at the site shall be coordinated with the Owner.

PART 2 - PRODUCTS

2.1 VIDEO

- A. Format: Digital recorded and submitted on DVD.
- B. Video Identification.
 - 1. Video Number: #####-XXX, where ##### is the Contract Number matching the Contract Drawings, and XXX is the video number, numbered sequentially from 001.
 - 2. On each video, clearly identify and indicate the Project name, Contract Number, date, and description of the subject(s) and location(s) of the video.
- C. Provide a binder with a log of all video taken for this Contract. Format of the log shall be tabular and shall include a description of each video that includes all the information specified in Section 2.1.B.

2.2 PHOTOGRAPHS

- A. Prints
 - 1. Type: Digital color prints
 - 2. Finish: Smooth glossy surface
 - 3. Size: Two photographs on one 8-1/2 by 11-inch sheet plus suitable margin for identification
 - 4. Paper: Single weight
 - 5. Electronic format: JPEG files on photographic compact disc (Photo CD).
- B. Print Identification
 - 1. Photograph Number: #####-XXX, where ##### is the Contract Number matching the Contract Drawings and XXX is the photograph number, sequentially numbered from 0001.
 - 2. On each photograph, clearly identify and indicate:
 - a. Project name and Contract Number.
 - b. The location/station/address where the photograph was taken.
 - c. The view/orientation of the photograph (compass direction) and vertical declination of view (horizontal, looking down/up, etc.).
 - d. Identification of main features in view.
 - e. Any other pertinent data and information.
 - f. Date and time
 - 3. Each print shall be identified with information on it in a manner that results in minimum interference with the print.
- C. Each page of two (2) prints shall be bound in a report meeting the following requirements:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Material or fabrication shall not cause print deterioration.
 2. Holder shall have a reinforced binding edge suitable for binder herein specified.
- D. Print Filing Binder
1. Binders shall be sturdy and durable.
 2. Label front of each binder with: Project name, Contract Number, "Project Photographs, Volume No. ____", and dates covered by photographs included in the binder.
 3. Binders shall be a size suitable for filing mounted prints.
 4. Permit convenient removal and insertion of mounted prints.
 5. Include a tabular log index, of all photographs, describing each photograph in the binder and including the information specified in Paragraph 2.2.B of this Section plus the weather conditions at the time of photography. For each photograph, indicate the photo CD it is included on.
 6. Include the photo CD(s) that contain the digital images of all the photographs that are included in the binder. Provide a sleeve or pocket in the binder for storing the photo CD(s). Each photo CD shall be numbered with a sequential number.
- E. Master Log of Photographs: Provide a binder with a master log of all photographs taken for this Contract. Format of the log shall be tabular and shall include a description of each photograph that includes all the information specified in Paragraph 2.2.B of this Section. For each photograph, indicate the photo CD it is included on. Include a separate tabular log of all photo CD(s) and cross-reference which photo numbers are included on each photo CD.

PART 3 - EXECUTION

3.1 GENERAL

- A. The pre- and post-construction surveys shall be performed in the presence of the Owner, the Owner's Engineer, or the Owner's designated representative. Provide at least seventy-two-hour (72-hour) notice before all survey activities.
- B. The Contractor may elect to perform pre- and/or post-construction surveys on buildings or structures not included in the limits specified in this Section. Such additional work shall be performed at no additional cost to the Owner.

3.2 PRE-CONSTRUCTION SURVEY

- A. Prior to construction, make video recordings of the entire project route including: facades of all buildings, sidewalks, pavement, walls, fences, utility manholes and pavement within one hundred (100') feet of the proposed Work. Voice over descriptions of defects shall be included.
- B. Prior to construction, take color photographs at fifty-foot (50-foot) intervals along the entire project route of facades of all buildings, each proposed specialty structure, manhole, and shaft location and each existing manhole. All photographs shall provide a visual means of scale.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. Take pre- and post-construction video and photographs of the exterior of each building. These video and photographs shall highlight any existing defects in building foundations and facades of the structures including locations and sizes of the following:
 - 1. Cracks in walls and foundations.
 - 2. Damaged, masonry, siding, windows/doors and roofing.
 - 3. Settlement of sidewalks, stairs and landings.
 - 4. Offset door jams and windows.
 - 5. For the purposes of estimating, the Contractor should assume that up to ten (10) photographs and three (3) minutes of video will be required for each structure along the alignment.
- D. The Contractor shall video tape and photograph pavement, sidewalks, walls, fences, and utility manholes within one hundred (100') feet of the proposed Work. Include curb lines, cracked sidewalks, and pavement settlement, the physical condition of streetlights, surface castings, etc. in the pre-construction survey.
- E. The Owner may direct the Contractor to inspect additional buildings outside of the specified limits at their discretion.

3.3 POST-CONSTRUCTION SURVEY

- A. Within thirty (30) days after completion of all below-grade work, perform an examination similar to the pre-construction survey. The post-construction survey and inspection shall include all areas and items inspected in the pre-construction survey, and shall also include properties, buildings, sites, and structures where written or verbal complaints of damage have been received, or damage claims have been filed. Seventy-two-hour (72-hour) notice shall be given to the Owner, Engineer, and all interested parties so that they may be present during final examination.
- B. The post-construction survey shall include all areas included in the pre-construction survey, with photographs and videos taken from the same viewpoints, plus areas of where additional damage or distress is noted or where complaints of such have been received by the Owner, Engineer or Contractor.
- C. Records of the final examination shall be distributed in the same manner as the original pre-construction survey.

END OF SECTION

SECTION 312000

EARTH MOVING FOR UTILITIES AND PAVEMENT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Excavation, backfill, and compaction for pavements, pads, utility trenches and structures, and landscaping.
2. Preparing subgrades for landscaping and associated site work. Refer to contract drawings for additional requirements and extent of project scope.
3. Removal of underground utilities as applicable.
4. Drainage course as specified within the contract drawings.
5. Subsurface drainage backfill for walls and trenches.
6. Excavation of all unsuitable materials encountered below indicated subgrade elevations.
7. Placement of subbase course for concrete pavements.
8. Placement of subbase and base course for asphalt paving.
9. Excavating and backfilling for utility trenches.
10. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
11. Dewatering and support of excavation of trenches and excavations.
12. Disposal of unsuitable or excess excavated material.
13. Coordinate with all trades for complete building and site utility systems.
14. Coordination with maintenance of safe path of travel for the public.

- B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 312000 – Earthwork - for site rough grading, removal of surplus or unsuitable materials, dust control, rough grading around trees to remain, frost protection, and preparation of subgrade for slabs and pavements.
2. Section 312295 – Support of Excavation
3. Section 312500 – Erosion and Sedimentation Controls for temporary erosion and sedimentation control measures.
4. Section 333913 – Manholes, Frames & Covers - for installing underground sewer pipes and manholes.

5. Section 334100 – Storm Drainage Piping - for installing underground drain pipes, manholes, area drains, water quality structures, and water storage tanks.
6. Section 334413 - Catch Basins

1.3 DEFINITIONS

- A. Backfill: Soil material or Controlled Density Fill (CDF) used to fill an excavation.
 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving and concrete paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture of heaving of the bottom of any excavation; and disposing of pumped water.
 1. Normal dewatering is defined as using conventional pumps installed in open excavations ditches, or sumps.
- F. Drainage Course: Course supporting the pavement that also minimizes upward capillary flow of pore water.
- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Owner's Representative or the Designer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Owner's Representative or the Designer. Unauthorized excavation, as well as remedial work directed by Designer, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that cannot be removed by normal rock excavating equipment without systematic drilling, ram hammering, ripping, or blasting, when permitted.

- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- K. Subbase Course: Course placed between the subgrade and base course for hot mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- M. Utilities: Onsite underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- N. Unsuitable Soils: Excavated soils that are determined by the Designer to not be reusable as fill or backfill on-site due to gradation, moisture content, and/or the presence of deleterious materials.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of plastic warning tape.
 - 2. Geotextile.
 - 3. Controlled Density Fill, including design mixture.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 1557 for each onsite and borrow soil material proposed for fill and backfill.
- C. Dewatering system: Contractor shall submit, for record, drawings and design data prepared, stamped, and signed by a registered professional engineer in the Commonwealth of Massachusetts who is experienced in groundwater control system design.
 - 1. The submittal shall show arrangement locations, and details of wells and well points and sump pumps; locations of risers, headers, filters, pumps, power units, all treatment components, and discharge lines; and means of discharge, control of sediment, and disposal of water.
 - 2. The submittal of the dewatering system will not relieve the Contractor from the responsibility for the adequacy of the dewatering system to achieve the required results specified in these Specifications and all permit requirements.
 - 3. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

4. Include a written plan for dewatering operations including control procedures to be adapted if dewatering problems arise.
 5. Include design calculations demonstrating adequacy of the proposed de-watering system and equipment.
 6. Provisions and methods of sediment removal and disposal of water.
 7. All permits required for the work.
- D. Support of Excavation: Contractor shall submit, for record, proposed excavation support systems (if required).
1. The proposed lateral support systems shall be designed and stamped by a registered professional engineer licensed in the Commonwealth of Massachusetts.
 2. Despite the submittal of the design of excavation support and protection systems, the Contractor shall remain solely responsible for the adequacy and safety of materials and methods used in construction.
 3. Include the following as a minimum on the drawings:
 - a. Details, arrangements, and methods of construction of the pro-posed system(s).
 - b. The method of installation and installation equipment.
 - c. The elevation of struts, shores, and tiebacks, as applicable, and permissible depth to which excavation may be carried before such supports are installed.
 - d. The excavation depths, the depth below the main excavation to which the support system will be installed, and the maximum design load to be carried by various members of the support system.
 - e. Design calculations including references to design methods used, assumptions, design parameters, design soil profile, material properties, allowable stresses, and other pertinent information stamped by a Professional Engineer registered in the Commonwealth of Massachusetts.
 - f. The location of existing utilities, facilities and/or structures nearby.
 4. Pre-excavation Photographs and Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations.
 - a. Submit before earthwork begins.
 - b. Maintain catalog of up-to-date photographs at the site.
 5. Plan to Maintain Safe Path of Travel: Submit plans for maintaining safe paths of travel for the general public during the entire project, including requirement for police details if necessary.

1.5 PROJECT CONDITIONS

A. Existing Utilities:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated.
 - a. Notify the Owner's Representative not less than two (2) days in advance of proposed utility interruptions.
 - b. Do not proceed with utility interruptions without the Owner's Representative's written permission.
 2. Contact utility-locator service for area where Project is located before excavating.
 - a. The Contractor shall notify "Dig Safe" at 1-888-DIG-SAFE prior to commencing any excavation work.
 3. Demolish and completely remove from site existing underground utilities and structures indicated to be removed.
 - a. Coordinate with utility companies to shut off services if lines are active.
- B. Survey Work: Contractor shall engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, and to establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
1. During earth moving operations, installation of excavation support and protection systems and dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions.
 2. Promptly notify Owner's Representative if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
- C. The Contractor shall not close or obstruct any street, sidewalk, or passageway without written permission from authorities having jurisdiction unless otherwise indicated on the Contract Drawings. The Contractor shall conduct the construction operations as to minimize interference with the use of roads, driveways, or other facilities near enough to the project to be affected by the work.
- D. The Contractor shall provide police details when working in roadways as required by local jurisdictional authorities. The Contractor shall pay for any and all police details.

1.6 EXCAVATION SUPPORT AND PROTECTION

- A. The Contractor shall furnish, install, monitor and maintain excavation support and protection systems (sheeting, shoring, and bracing) at locations necessary to support the sides of excavations and resist soil and hydrostatic pressure and superimposed and construction loads; to prevent danger to persons or damage to adjacent pavements, facilities, utilities, or structures; to prevent injurious caving or erosion or the loss of ground; and to maintain pedestrian and vehicular traffic as required by the Contract Documents, the Contractor's sequence of construction, and as directed by the Owner's Representative.

- B. In all sheeting, shoring and bracing operations, care shall be taken to prevent collapse of excavations, injury to persons or damage to adjacent structures, facilities, utilities, and services. Any injuries to persons shall be the responsibility of the Contractor; and any damage to the work occurring as a result of settlement, water or earth pressure, or other causes due to inadequate bracing or other construction operations of the Contractor shall be satisfactorily repaired and made good by the Contractor, at no additional cost to the Owner.
- C. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.
- D. Where sheeting is to be used, it shall be driven ahead of excavation operations to the extent practicable so as to avoid the loss of material from behind the sheeting; where voids occur outside of the sheeting, they shall be filled immediately with ordinary fill, thoroughly compacted.
- E. The Contractor shall leave in place all sheeting and bracing at the locations and within the limits ordered by the Owner's Representative in writing. The Contractor shall cut off the sheeting at elevations as indicated on the Contract Drawings or to be determined with the approval of the Owner's Representative.
- F. The Contractor shall comply with all federal, state, and local safety regulations, and requirements.

1.7 DEWATERING

- A. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property.
- B. Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Owner's Representative and/or the Designer, at no additional cost to the Owner. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.
- C. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and stormwater management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

- D. The Contractor shall control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, temporary ditches shall be provided to control drainage. Upon completion of the work and when directed, all areas shall be restored by the Contractor in a satisfactory manner and as directed.
- E. Remove dewatering system when no longer required for construction.
- F. The Contractor shall obtain and maintain all required local, state, and federal permits necessary for construction dewatering for the duration of dewatering activities including all chemical testing required for disposal and discharge of dewatering effluent. The Contractor shall be responsible for treatment of water, if necessary, to meet minimum discharge criteria specified in the permits.

1.8 QUALITY CONTROL

- A. Inspection and testing will be performed by the Contractor to ensure that the materials placed meet the requirements in this section. Fill materials imported from off-site sources shall be chemically and geotechnically tested once for every 2,000 tons of material.
- B. If fill soils are not obtained from a commercial gravel pit, the Contractor shall provide certified analytical testing of offsite backfill to demonstrate that the soil does not exceed the limitations for MCP reference/reportable concentrations. Analyses shall include RCRA-8 metals, Extractable and Volatile Petroleum Hydrocarbons (EPH/VPH), and Volatile Organic Compounds (by EPA Method 8260B/5035). No testing will be required of imported fill soils obtained from a commercial gravel pit, provided the soils are free of odors, discoloration, staining or other conditions indicative of contamination, in the opinion of the Geotechnical Engineer and/or the Designer.
- C. Tests and analysis of soil material will be performed in accordance with ASTM D422, ASTM D1557, ASTM D2922, ASTM D3017 and ASTM D4318.
- D. If tests indicate materials do not meet specified requirements, the Contractor shall identify an alternative borrow source, test the new material, and submit results to the Designer at no cost to Owner.

1.9 LAYOUT AND GRADES

- A. The Contractor is responsible for establishing vertical and horizontal control for the work and shall establish permanent benchmarks and replace as directed any that are destroyed or disturbed. The Contractor shall maintain sufficient reference points at all times during construction to properly perform site grading. The existing survey benchmark shall be protected throughout the construction project.
- B. Finished grades, contours, and elevations indicated on the Drawings describe final surface elevation for completed construction. The words "finished grade" as used herein shall mean

final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slope between points and existing established grades.

1.10 QUALITY ASSURANCE

- A. Field inspection and testing may be performed by a Geotechnical Engineer at the Owner's expense to supplement the Contractor's Quality Control testing. Classification of all materials will be made by the Geotechnical Engineer whose decision shall be final and binding on the Contractor.
- B. The Contractor shall be responsible for managing and tracking all materials excavated and placed in stockpiles for testing.
- C. Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. The Contractor is responsible for the adequacy of the dewatering systems.
 - 1. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of two (2) feet below excavation bottom, unless otherwise directed by the Designer, so that all excavation bottoms are firm and dry.
 - 2. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes, and appurtenance to be built therein have been completed to the extent that they will not be floated or otherwise damaged.
 - 3. The dewatering system and excavation support shall be designed so that the lowering of the groundwater level outside the excavation does not adversely affect adjacent structures, utilities or other improvements.
- E. The Owner will perform in place density tests in accordance with ASTM D2922 or D3017 as the Work progresses, to determine the degree of compaction. Any corrective work required as a result of such tests, such as additional compaction, or a decrease in the thickness of layers, shall be performed by the Contractor at no additional expense to Owner. In place density testing shall be made at the Contractor's expense by a qualified geotechnical testing laboratory.
- F. The Designer's duties do not include the supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Designer nor any observation and testing by the Geotechnical Engineer shall excuse the Contractor from defects discovered in his Work at that time or subsequent to the testing.
- G. Contractor shall assist the Owner's Testing Laboratory in performing in-place density testing at a minimum frequency of one test per lift but no less than one test per 200 cubic yards of material placed in any one lift. Compaction testing will be performed in accordance with ASTM D1557, D2922, and D3017.
- H. Subgrades shall be approved for compactness and material composition prior to

- I. placing subsequent lifts. If inspections indicate Work does not meet specified requirements, the work shall be removed, replaced, and compacted at no additional cost to Owner.

1.11 REGULATORY REQUIREMENTS

- A. Comply with the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et seq.). Contractors shall be familiar with the requirements of these regulations.
 - 1. All excavations shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P), State, and local requirements. Where conflict between OSHA, State, and local regulations exists, the most stringent requirements shall apply.
- B. Comply with governing EPA notification regulations before, during, and upon completion of dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Comply with all rules, regulations, laws, and ordinances of the municipality, the Commonwealth of Massachusetts, and other authorities having jurisdiction over the project site or work. All labor, materials, equipment, and services necessary to make the work comply with requirements shall be provided by the Contractor without additional cost to the Owner.
- D. The Contractor shall obtain and pay for all permits and licenses required to complete the work specified herein and indicated on the Contract Drawings.

1.12 EXAMINATION OF SITE AND DOCUMENTS

- A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation of the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period and formed his own conclusions as to the full requirements of the work involved.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 2. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - a. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- B. Ordinary Borrow:
1. Ordinary borrow shall meet the requirements of MassDOT M1.01.0.
 2. It shall be well-graded, natural inorganic soil containing no stone greater than 6 inches maximum dimension.
 3. The materials shall be free of trash, ice, snow, tree stumps, roots, and other organic and deleterious materials.
 4. It shall be free of highly plastic clays, of all materials subject to decay, or other materials that will corrode piping or metals.
 5. Ordinary borrow shall have a maximum dry density of not less than 110 pounds per cubic foot.
 6. It shall be of such a nature and character that it can be compacted to the specified densities.
 7. Topsoil shall not be considered ordinary borrow.
 8. Existing available fill materials from onsite excavations may be reused as ordinary borrow if it meets the above requirements.
 9. It shall be graded within the following limits:

| U.S Standard Sieve Size | Percent Finer by Weight |
|-------------------------|-------------------------|
| 6 inch | 100 |
| No.10 | 30-90 |
| No. 40 | 10-70 |
| No. 200 | 0-15 |

C. Gravel Borrow:

1. Gravel borrow shall meet the requirements of MassDOT M1.03.0, Type B.
2. It shall be an inert, hard, durable sand and gravel or stone soil obtained from an offsite commercial source.
3. It shall be free of ice, snow, roots, sod, rubbish, oil, hazardous material, and other deleterious or organic matter.
4. It shall be graded within the following limits:

| U.S. Standard Sieve Size | Percent Finer by Weight |
|--------------------------|-------------------------|
| 3 inch | 100 |
| ½ inch | 50-85 |
| No. 4 | 40-75 |

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

| | |
|---------|------|
| No. 50 | 8-28 |
| No. 200 | 0-10 |

D. $\frac{3}{4}$ " Crushed Stone:

1. $\frac{3}{4}$ " crushed stone shall meet the requirements of MassDOT M2.01.4.
2. It shall consist of durable crushed rock or crushed gravel stone, free of ice, snow, sand, silt, clay, loam, shale, or other deleterious or organic matter.

Project Number 21.926301.00
 Pedestrian Safety & Traffic Circulation Improvements Project
 Dracut Public Schools
 Town of Dracut, Massachusetts

3. It shall be graded within the following limits:

| U.S. Standard Sieve Size | Percent Finer by Weight |
|--------------------------|-------------------------|
| 1 inch | 100 |
| 3/4 inch | 90-100 |
| 1/2 inch | 10-50 |
| 3/8 inch | 0-20 |
| No. 4 | 0-5 |

E. 1-1/2" Crushed Stone:

1. 1-1/2" crushed stone shall meet the requirements of MassDOT M2.01.1.
2. It shall consist of durable crushed rock or crushed gravel stone, free of ice, snow, sand, silt, clay, loam, shale, or other deleterious or organic matter.
3. It shall be graded within the following limits:

| Sieve Size | Percent Finer by Weight |
|------------|-------------------------|
| 2 inch | 100 |
| 1-1/2 inch | 95-100 |
| 1 inch | 35-70 |
| 3/4 inch | 0-25 |

F. Dense Graded Crushed Stone:

1. Dense graded crushed stone shall meet the requirements of MassDOT M2.01.7.
2. It shall consist of a mixture of crusher-run aggregate of crushed stone mixed with natural sand and gravel soil obtained from an offsite commercial source.
3. It shall be free of ice, snow, roots, sod, rubbish, soil, hazardous material, and other deleterious or organic matter.
4. It shall be graded within the following limits:

| U. S. Standard Sieve Size | Percent Finer by Weight |
|---------------------------|-------------------------|
| 2 inch | 100 |
| 1-1/2 inch | 70-100 |
| 3/4 inch | 50-85 |
| No. 4 | 30-55 |
| No. 40 | 8-24 |
| No. 200 | 3-10 |

G. Sand:

1. Sand shall meet the requirements of MassDOT M1.04.1.

Project Number 21.926301.00
 Pedestrian Safety & Traffic Circulation Improvements Project
 Dracut Public Schools
 Town of Dracut, Massachusetts

2. It shall consist of clean inert, hard, durable grains of quartz or other hard durable rock, free from clay, organics, surface coatings, or other deleterious or organic matter.
3. It shall be graded within the following limits:

| U. S. Standard Sieve Size | Percent Finer by Weight |
|---------------------------|-------------------------|
| $\frac{1}{2}$ inch | 100 |
| 3/8 inch | 85-100 |
| No. 4 | 60-100 |
| No. 16 | 35-80 |
| No. 50 | 10-55 |
| No. 100 | 2-10 |

H. Dumped Riprap:

1. Stone used for dumped riprap shall be hard, durable, angular in shape stones, and resistant to weathering.
2. Neither breadth nor thickness of a single stone should be less than one-third its length.
3. Rounded stone or boulders will not be accepted unless authorized by the Engineer.
4. Each load of riprap shall be reasonably well graded from the smallest to the maximum size specified.
5. Stone shall be free from overburden, spoil, shale, and organic material and shall conform to the following gradation with no more than 5% by weight passing a 2-inch sieve:

| Weight of Stone (lbs.) | Percent Finer by Weight |
|------------------------|-------------------------|
| 400 | 100 |
| 300 | 50 |
| 200 | 30 |
| 25 | 10 |

I. Stone for Pipe Ends:

1. Stone for pipe ends shall be sound, curable rock which is angular in shape. Rounded stones, boulders, sandstone or similar stone or relatively thin slabs will not be acceptable.
2. Each stone shall weigh not less than 50 pounds not more than 125 pounds and at least 75% of the volume shall consist of stones weighing not less than 75 pounds each.
3. The remainder of the stones shall be so graded that when placed with the larger stones the entire mass will be compact.

J. Controlled Density Fill (CDF):

1. CDF shall be a cement concrete backfill material that flows like a liquid, supports like a solid when cured, and levels without tamping or vibrating to reach 100 percent compaction.

2. CDF shall meet the requirements of MassDOT Specifications M4.08.00 for Type 1E (Very Flowable, Excavatable) or type 2E (Flowable, Excavatable) CDF.
 3. The mix formulation will be submitted to the Designer for review prior to placement of the material in the project.
- K. Reuse of Excavated Rock: Excavated on-site rock materials processed by the Contractor meeting the gradation limits for 3/4" Crushed Stone, 1-1/2" Crushed Stone, Dense Graded Crushed Stone, and Stone for Pipe Ends contained herein may be segregated and reused as approved by the Owner.

2.2 GEOTEXTILES

- A. See geotextiles shown in pavement section detail on the Drawings.
- B. Subsurface Drainage Geotextile:
 1. Nonwoven needle-punched geotextile
 2. Manufactured for subsurface drainage applications
 3. Made from polyolefins or polyesters
 4. Complying with AASHTO M 288 and the following properties, measured as per the referenced test methods:
 - a. Survivability: Class 2; AASHTO M 288
 - b. Elongation: 50% (min.); ASTM D 4632
 - c. Grab Tensile Strength: 160 lbf; ASTM D 4632
 - d. Trapezoid Tear Strength: 60 lb; ASTM D 4533
 - e. CBR Puncture Strength: 410 lb; ASTM D 6241
 - f. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751
 - g. Permittivity: 1.50 sec-1 (min.); ASTM D 4491
 - h. UV Stability: 70% after 500 hours exposure; ASTM D 4355
- C. Separation Geotextile:
 1. Woven geotextile fabric
 2. Manufactured for separation applications
 3. Made from polyolefins or polyesters
 4. Complying with AASHTO M 288 and the following properties, measured as per the referenced test methods:
 - a. Survivability: Class 1; AASHTO M 288
 - b. Elongation: 15% (max); ASTM D 4632
 - c. Grab Tensile Strength: 315 lb; ASTM D 4632
 - d. Trapezoidal Tear Strength: 120 lbf; ASTM D 4533
 - e. Puncture Strength: 1,000 lb; ASTM D 6241
 - f. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751
 - g. Permittivity: 0.05 sec-1, (min.); ASTM D 4491
 - h. UV Stability: 70 percent after 500 hours exposure; ASTM D 4355

2.3 ACCESSORIES

- A. Detectable Underground Warning Tapes:
1. Acid and alkali-resistant polyethylene plastic film warning tape
 2. The tape shall have a metallic core encased in a protective jacket for corrosion protection and be detectable by a metal detector when the tape is buried up to 2.5-feet deep.
 3. 6-inches wide by 4-mils minimum thickness
 4. Continuously printed caption in black letters "CAUTION - xxxx LINE BURIED BELOW."
 5. The text and color of the tape shall be as shown in the table below:

| Color | Utility |
|-------------------------------|---|
| Safety Red | Electric |
| High Visibility Safety Yellow | Gas, Oil, Steam |
| Safety Alert Orange | Telephone, Communications, Cable Television |
| Safety Precaution Blue | Water System, Irrigation |
| Safety Green | Sanitary Sewer, Storm Sewer |
| White | Proposed Excavation |

2.4 USES OF MATERIALS

- A. Fill materials listed in Paragraph 2.1 above shall be utilized as follows and as otherwise indicated on the Drawings, specified or directed.
- B. Gravel Borrow:
1. As fill and base coarse soils below cement concrete and hot-mix asphalt pavements as shown on the Contract Drawings.
 2. Trench backfill within paved areas.
 3. Bedding for ductile iron drain, water, and sewer piping.
- C. Dense Graded Crushed Stone:
1. As base course soils below cement concrete and hot-mix asphalt pavement as shown on the Contract Drawings.
- D. 3/4-inch and 1-1/2-inch Crushed Stone:
1. Base for drain manholes, catch basins, sewer manholes, and utility structures.
 2. Bedding for drain pipe and sewer pipe.
 3. Around perforated drain lines.
 4. To stabilize wet subgrade conditions.
 5. Elsewhere as shown on the Drawings or specified herein.

6. To aid in dewatering.
- E. Sand:
 1. Bedding for drain, water, sewer, and other utility piping.
 2. Elsewhere as shown on the Drawings or specified herein.
- F. Ordinary Borrow:
 1. For general site fill outside of the proposed building footprint, concrete, and bituminous concrete areas.
 2. Trench backfill material outside of paved areas.
 3. Elsewhere as shown on the Drawings or specified herein.
- G. Geotextiles:
 1. Subsurface non-woven Drainage Geotextile shall fully wrap 3-4-inch Crushed Stone.
 - a. Use to prevent soil intrusion into drains and/or to assist in stabilizing soil subgrades prior to placement of fill materials.
 2. Subsurface woven separation geotextile as separation material between crushed stone and gravel borrow base materials below cement concrete and hot-mix asphalt pavement as shown on the Contract Drawings.
 - a. Where indicated or shown in the Contract Drawings.
- H. Controlled Density Fill (CDF):
 1. CDF shall be used as shown on the Contract Drawings.
 2. CDF shall be used if directed by the DESIGNER as fill at the limits of the excavation areas.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The Contract Drawings indicate the proposed finish alignment, elevation, and grade of the work. Establish the line and grade in close conformity with the Contract Drawings.
- B. The Contractor is responsible for establishing construction phasing, means, and methods and interim grading and temporary conditions required to attain the finish product required by the Contract Documents. The Contractor is responsible for all construction, protection, movement, and maintenance of stockpiles. Establish and maintain suitable benchmarks and grade control to accurately perform the work.

- C. No excavation shall be deposited or stockpiled at any time to endanger portions of new or existing structures, either by direct pressure or indirectly by overloading banks contiguous to the operation. Material, if stockpiled, shall be stored so as not to interfere with the established sequence of the construction. If there is not sufficient area available for stockpiling within the limits of the project, the Contractor will be required to furnish his own area for stockpiling.
- D. When the plans require excavation in areas in close proximity to existing buildings, roads, structures and utilities it shall be the responsibility of the Contractor at his expense to use satisfactory means and methods to protect and maintain the stability of such roads, and structures located immediately adjacent to but outside the limits of excavations.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface.
- C. Protect and maintain erosion and sedimentation controls, which are specified in Section 312500 – EROSION AND SEDIMENTATION CONTROLS, during earth-work operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.3 DEWATERING

- A. Provide Dewatering as required to maintain dry excavations.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
 3. Where soil has been softened or eroded by flooding, equipment, traffic or placement of fill or concrete during unfavorable weather or such other conditions, it shall be removed and replaced by the Contractor with suitable material and at the Contractor's expense. The necessity and extent of such removals shall be determined by the Designer.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
- E. Monitor dewatering systems continuously.
- F. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 - 1. Space well points or wells at intervals required to provide sufficient de-watering.
 - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- G. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until de-watering is no longer required.
- H. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- I. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- J. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- K. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to the Owner.
 - 1. Remove dewatering system from Project site on completion of dewatering.
- L. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
- M. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.4 EXCAVATION SUPPORT AND PROTECTION

- A. Work shall not be started until all materials and equipment necessary for the construction are either on the site of the work or satisfactorily available for immediate use as required.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support and protect utilities encountered.
- C. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner's Representative and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- D. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces or installation of improvements is not impeded.
- E. The excavation support and protection systems shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation.
- F. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- G. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.
- H. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at his expense.
- I. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
 - 2. Fill voids immediately with approved backfill compacted to density specified herein.
 - 3. Repair or replace, as approved by Owner's Representative, adjacent work damaged or displaced by the installation, performance, and removal of the excavation support and protection systems.

3.5 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms.
 - b. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - c. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
- B. Provide sheeting, shoring and bracing to complete and protect all excavated areas, are required for safety and compliance with OSHA. Cost for sheeting, shoring and bracing shall be included as a part of the contract price for completing the work and Owner shall make no separate payment for this work.
- C. Perform excavation work in accordance with all applicable Federal, State, and Local regulations regarding safe excavation work.
- D. Excavation in the area of existing utilities. Expose utilities by hand or other excavation methods that will prevent damage. Required excavation near electric, gas, water lines, and fiber-optic telecommunication lines shall be hand dug within 3 feet of the lines.
- E. Do not excavate to full depths when freezing temperatures may be expected unless subgrades are protected from freezing.

3.6 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavation for Underground Tanks, Manholes, Basins, Mechanical and/or Electrical Utility Structures, Drainage and Sewer Systems, Infiltration Systems, and Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.8 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.9 SUBGRADE INSPECTION

- A. Notify the Owner's Representative when excavations have reached required subgrade.
- B. If the Owner's Representative, Geotechnical Engineer and/or the Designer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll granular subgrade below structures and pavements with heavy vibrating drum roller to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with approved equipment weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Designer, and replace with compacted backfill or fill as directed.

- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Geotechnical Engineer and/or the Designer, without additional compensation.
- E. Protect all subgrades from disturbance.
 - 1. Place Gravel Borrow or Crushed Stone wrapped in non-woven geotextile over clayey, silty or wet footing subgrades. Fill shall not be placed in standing water.
 - 2. Grade around prepared subgrade areas to direct stormwater runoff away from the work area.
 - 3. Protect subgrades from frost at all times during construction. Fill should not be placed over frozen soil.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavations under site improvement construction or utility pipe as directed by Designer. Lean concrete fill, with 28-day compressive strength of 2500 psi may be used when approved by Designer.

3.11 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials (from off-site sources) and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Stockpile soil materials in a location, acceptable to the Owner's Representative, that will preclude having to relocate stockpiled soil materials that would otherwise delay or impact the Work.

3.12 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on previously placed and compacted fill and/or subgrades free of mud, frost, snow, or ice.
- C. Excavated on-site natural soils may be used as Ordinary Fill, provided the material can be placed and compacted as required herein and at the approval of the Designer.
- D. The Contractor shall not commence backfilling operations without approval of the Owner's Representative and/or the Designer.
- E. The Contractor shall maintain a dry and firm subgrade throughout construction. Dewatering shall be performed as needed at the Contractor's expense.
- F. The Contractor shall strip the existing subgrade of any vegetation, topsoil, organics, debris, or other unsuitable materials. The subgrade shall be proof compacted using a vibratory roller to treat any loose or disturbed areas and to provide a dense uniform surface.
- G. After the subgrade has been prepared, fill material shall be placed and built-up in successive layers until the required elevations are reached. No fill shall be placed on a frozen surface, nor shall snow, ice, or other frozen materials be included in fill. Wet materials containing moisture in excess of the amount necessary for satisfactory placement or compaction shall not be used.
- H. All fill shall be brought up in essentially level lifts and shall be placed in levels by standard methods. Layers of fill outside of utility trenches shall not exceed nine (9) inches in uncompacted thickness before compaction, unless otherwise specified, or as required for proper subgrade stabilization.
- I. Filling operations shall continue until the fill has been brought up to the finished slopes, lines, and grades making proper allowances for thickness of the overlying topsoil.
- J. The entire surface of the work shall be maintained free from ruts and in the condition that will permit construction equipment to travel over any section readily. The top surface of each layer shall be made level or slightly sloped toward the center of the filled area.
- K. Backfilling shall not be performed when weather conditions or the conditions of the materials are such that, in the opinion of the Geotechnical Engineer or the Designer, work cannot be performed satisfactorily.

3.13 BACKFILLING AGAINST STRUCTURES

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Backfilling against masonry or concrete shall not be done until permitted by the Owner's Representative. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking or other damage.

- C. As soon as practicable after the structures are structurally adequate and other necessary work has been satisfactorily completed and approved, special leakage tests of the structures shall be made by the Contractor, as required by the Owner's Representative. After the satisfactory completion of leakage tests and the satisfactory completion of any other required work in connection with the structures, the backfilling around the structures shall proceed using suitable and approved excavation material.
- D. The best of the backfill material shall be used for backfilling within 2-feet of the structure. Just prior to placing backfill, the areas shall be cleaned of all excess construction material and debris and the bottom of excavations shall be in a thoroughly compacted condition.
- E. Symmetrical backfill loading shall be maintained. Special care shall be taken to prevent any wedging action or eccentric loading upon or against the structures. During backfilling operations, care shall be exercised that the equipment used will not overload the structures in passing over and compacting these fills. Except as otherwise specified or directed, backfill shall be placed in layers not more than 12 inches in loose depth and each layer of backfill shall be compacted thoroughly and evenly using approved types of mechanical equipment. Each pass of the equipment shall cover the entire area of each layer of backfill.
- F. In compacting and other operations, the Contractor shall conduct his operations in a manner to prevent damage to structures due to passage of heavy equipment over, or adjacent to, structures, and any damage thereto shall be made good by the Contractor at no additional expense to the Owner.

3.14 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.
- D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- E. Place and compact initial backfill of subbase material free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

- G. Backfill material shall be placed in maximum 6-inch lifts and mechanically compacted as specified herein.
- H. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- I. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
- J. Any trenches or excavations improperly backfilled or where settlement occurs shall be reopened, to the depth required for proper compaction, then refilled and compacted with the surface restored to the required grade and condition, at no additional expense to the Owner.
- K. During filling and backfilling operations, pipelines will be checked by the Owner's Representative to determine whether any displacement of the pipe has occurred. If the observation of the pipelines shows poor alignment, displaced pipe or any other defects they shall be remedied in a manner satisfactory to the Owner's Representative at no additional cost to the Owner.

3.15 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
- C. Place soil fills on subgrades free of mud, frost, snow, or ice.

3.16 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
 3. Fill material shall not be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

3.17 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

| Area | ASTM Density Degree of Compaction |
|---|-----------------------------------|
| Pavement and walkway base course | 95% |
| Pavement and walkway subgrade | 95% |
| General fill below pavement and walkway subbase | 95% |
| Trench backfill – | |
| A. below pavements | 95% |
| B. below landscaped areas | 92% |
| C. below structures | 95% |
| All other areas | 90% |

- 1. Under structures and pavement, proof-compact existing subgrade. Compact each layer of backfill soil material at 95 percent of the soils' maximum dry density (per ASTM D 1557). Fill areas within the 1H:1V influence zone of foundations and retaining wall footings shall also be compacted to 95 percent of the soils' maximum dry density (per ASTM D 1557).
 - 2. Under walkways, scarify and re-compact top 6 inches below subgrade to 95 percent of the soils' maximum dry density (per ASTM D 1557). Fill and base course material within 2 feet of the finished asphalt or concrete pavement grade shall be compacted to 95 percent of the soils' maximum dry density (per ASTM D 1557).
 - 3. For utility trenches in paved areas, compact each layer of initial and final backfill soil material to at least 95 percent of the soils' maximum dry density (per ASTM D 1557).
 - 4. For utility trenched in lawn or unpaved areas, compact each layer of back-fill soil material to at least 92 percent of the soils' maximum dry density (per ASTM D 1557).
 - 5. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material to at least 90 percent of the soils' maximum dry density (per ASTM D 1557).
- D. In confined areas, place Crushed Stone in maximum 6-inch lifts and compact each lift with at least 4 passes of a vibratory plate compactor to a firm and unyielding surface. In open areas, place Crushed Stone in maximum 12-inch lifts and compact each lift with at least four passes of a vibratory drum roller with a minimum static weight of 10,000 pounds. Crushed stone fill shall be wrapped on all sides with non-woven filter fabric.

3.18 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.

3.19 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Division 2 Section "Subdrainage."
 - 1. Subsurface Drain: Place subsurface drainage geotextile around perimeter of sub-drainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 - a. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 1557.
 - 2. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with 1 layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 - a. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 1557.
 - b. Place and compact impervious fill over drainage backfill in 6-inch-thick compacted layers to final subgrade.

3.20 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Install separation geotextile fabric on prepared subgrade, where indicated on the Contract Drawings, according to manufacturer's written instructions, overlapping sides and ends.
 2. Place base course material over subbase course under hot-mix asphalt pavement.
 3. Shape subbase and base course to required crown elevations and cross-slope grades.
 4. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
 5. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 6. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
- C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.21 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under pavements, walkways and cast-in-place concrete slabs-on-grade as follows:
 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.22 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Cooperate with the Independent Testing Agency engaged by the Owner for field quality control activities for the Work of this Section. Refer also to Section 014325 - TESTING AGENCY SERVICES.
- B. Cooperate with field quality control personnel.
- C. Additional inspections and retesting of materials which fail to comply with specified material and installation requirements shall be performed at Contractor's expense.
- D. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
 2. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained. Costs related to retesting due to unacceptable quality of work and failures discovered by the testing shall be borne by the Contractor.
- G. Notify the Independent Testing Agency a minimum of 72 hours prior to start of earthwork operations, to comply with Code requirement that a registered design professional be present at all times during backfill to assure adequate compaction with no bridging effects. The services of the Testing Agency, Geotechnical Engineer, and the Designer shall include but not be limited to the following:
1. Observation during excavation, backfilling, and compaction.
 2. Laboratory testing and analysis of fill materials specified or proposed for use as required.
 3. Observation of construction and performance of water content, gradation, and compactions tests at a frequency and at locations that he/she shall selects. The results of these test will be submitted to the Owner's Representative so that the Contractor can take such action as is required to remedy any indicated deficiencies.
 4. Observation of proof-compaction of exposed subgrades. Proof compaction may be waived if, in the opinion of the Geotechnical Engineer, disturbance will occur and cause loss of strength of underlying soil.
- H. The Contractor shall make provisions for allowing observations and testing of Contractor's Work by the Testing Agency and the Geotechnical Engineer, and the Designer. The presence of the Testing Agency, Geotechnical Engineering, and/or the Designer does not include supervision or direction of the actual work by the Contractor, his/her employees, or agents. Neither the presence of the Testing Agency, Geotechnical Engineer, and/or the Designer nor any observations and testing performed by those entities or any notice or failure to give notice, shall excuse the Contractor from defect discovered in his/her work.
- I. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- J. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Designer; reshape and recompact.
- K. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Contractor shall remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION

SECTION 312200

EARTHWORK

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials and equipment necessary to complete the Work shown on the Drawings and as specified in this Section, which, without limiting the generality thereof, includes:
 - 1. Removal and disposal of existing pavement, curbs, and other materials to be disposed.
 - 2. Excavation, filling, grading, and compaction as indicated or required, including backfilling and compaction following demolition and removal of previously existing utilities/specialty structures.
 - 3. Supplying of all fill materials including all handling, hauling, and placing of stockpiled materials for use in refilling, filling, backfilling, grading, and such other operations.
 - 4. Excavation and legal off-site disposal of all unsuitable or excess materials.
 - 5. Furnishing and installing base and subbase course materials under structures, pavements, slabs and footings, including compaction.
 - 6. Trench excavation, bedding and backfill for all utilities, structures, foundations, foundation drains, retaining walls and utilities, including compaction.
 - 7. Furnishing and installing, as required, temporary excavation support including sheeting, shoring and bracing of shallow trench excavation. Support of excavation requirements are specified in Section 312295.
 - 8. Protection of existing buildings, structures, pavements and utilities to remain.
 - 9. Dewatering, as required, including all necessary control, management, and disposal of groundwater on a twenty-four-hour (24-hour) basis during construction. Dewatering requirements are specified in Section 312319.
 - 10. Protection of slopes surrounding the Work area from erosion and undermining.

1.2 RELATED SECTIONS

- A. Section 013300 – Submittals
- B. Section 312295 – Excavation Support
- C. Section 312319 – Dewatering

1.3 APPLICABLE STANDARDS

- A. ASTM C136 - Method for sieve analysis of fine and coarse aggregates.
- B. ASTM D422 – Standard Test Method for Particle Size Analysis of Soils

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. ASTM D1557 - Test methods for moisture-density relations of soils and soil aggregate mixtures using ten-pound hammer (10 lb.) and eighteen-inch (18") drop.
- D. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- E. ASTM D3017 - Test methods for moisture content of soil and soil-aggregate in place by nuclear methods (shallow depth).
- F. ASTM D1556 - Test methods for density of soil and soil-aggregate in place by the sand cone method.
- G. OSHA Regulations, 29CFR Part 1926 – Excavations, current revisions.
- H. Massachusetts Highway Department Standard Specifications for Highways and Bridges
- I. Comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to the Town of Dracut, Dracut Public Schools, and the Commonwealth of Massachusetts. All labor, materials, equipment and services necessary to make work comply with such requirements shall be provided without additional cost to the Owner.

1.4 DEFINITIONS

- A. The phrase "in-the-dry" used in this Section shall be defined as an excavation subgrade where the groundwater level has been lowered to at least two feet (2') below the lowest level of the excavation, is stable with no ponded water, mud, or muck, is able to support construction equipment without rutting or disturbance and is suitable for the placement and compaction of fill material or concrete foundations.

1.5 QUALITY ASSURANCE

- A. The Contractor shall have at least five (5) years of experience with similar work to that shown on the Drawings and specified herein.
- B. The Contractor's Engineer shall have at least five (5) years of experience with similar work to that shown on the Drawings and specified herein.

1.6 SUBMITTALS

- A. Make submittals in accordance with Section 013300 – Submittals.
- B. Submit the following information at the times indicated:
 1. A methods of construction submittal for various portions of the Work. Include a schedule and a detailed one-inch equals twenty feet (1"=20') scale plan and written description of proposed sequence of excavation, including other related activities, a minimum of two (2) weeks prior to start of excavation.
 2. Specifics of proposed compaction equipment, including description and specifications, a minimum of two (2) weeks prior to start of compaction work.
 3. For each type of material to be utilized as fill or backfill, the Contractor shall provide the Engineer at the Engineer's designated laboratory with one (1) representative fifty-pound (50 lb.) bag sample from each proposed source of material a minimum of two (2) weeks prior to delivery to the site.
 4. For off-site materials, submit the name of each material supplier with specific type and source of each material at least two (2) weeks prior to delivery to the site. Include the results of environmental testing specified herein. Any change in type or source of material during the work requires the written approval of the Engineer.
 5. All off-site material brought to the site shall be free of contaminants. The Contractor shall identify the source of the material and be prepared to provide results of environmental testing performed on a representative sample of the material from each source. As a minimum, environmental testing shall include Total Petroleum Hydrocarbons (TPH) by ASTM D3328/EPA Method 8100, Polynuclear Aromatic Hydrocarbons (PAH) by EPA Method 8270, and metals (RCRA 8) by EPA Methods 6010/7471A.
 6. Recycled Concrete Fill: Crushed or recycled concrete and asphalt may *not* be used unless approved in writing by the Owner.
 7. Submit representative samples of any geotextiles or other materials proposed for use, with manufacturer's specifications and product literature.
 8. Provide a submittal for any trench boxes to be used, to the Engineer no later than two (2) weeks before construction operations begin. Trench boxes do not constitute excavation support – they may only be used for shallow excavations above the water table. Support of excavations below the water table is specified in Section 312295.
- C. The time period(s) specified for submittals are the minimum required to review, evaluate and respond to the Contractor. If, after review, resubmission is required for any reason, the specified time period(s) shall commence upon the date of receipt of the resubmittals. The Contractor is responsible for scheduling specified submittals and resubmittals so as to prevent delays in the work.
- D. Coordinate earthwork, excavation support, and dewatering submittals. Do not proceed with any excavation until each of the specified submittals have been reviewed and accepted by the Engineer.
- E. Despite review and comment by the Engineer, the Contractor shall remain solely responsible for the adequacy and safety of materials and methods used in construction.

1.7 PROJECT CONDITIONS

- A. Visit the site to review all details of the work and working conditions and to verify dimensions in the field. Notify the Engineer in writing of any discrepancy before performing any work.
- B. Consult official records of existing utilities, both surface and subsurface, and their connection to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.
- C. Protect existing utilities to remain within the work area in accordance with the requirements of authorities having jurisdiction over same.
- D. Notify the Engineer in writing if unexpected subsurface conditions are encountered.

1.8 SUBSURFACE DATA

- A. Review logs of subsurface explorations and other pertinent data for the site. After obtaining Owner's permission, take whatever additional subsurface explorations deemed necessary at no expense to the Owner.
- B. The aforementioned data is for general information and is accurate only at the particular locations and times the subsurface explorations were made. It is the Contractor's responsibility to make interpretations and draw conclusions based on the character of materials to be encountered and the impact on his work based on his expert knowledge of the area and of earthwork techniques.
- C. By submitting a Bid, the Contractor affirms that the site and conditions affecting the Work under this Section have been carefully examined. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation at the site.

1.9 LAWS AND REGULATIONS

- A. All work shall be performed in accordance with the regulations of local, county, and State agencies and national or utility company standards as they apply.
- B. Obtain all required permits, licenses, and approvals of appropriate municipal and utility authorities prior to commencing the Work of this Section and pay all costs incurred therefrom.
- C. Follow the applicable safety standards and guidelines as established by OSHA and other local, state, and federal governing agencies.
- D. Conform to applicable regulatory procedures when discovering potentially hazardous, special or contaminated materials.
- E. Legally remove and dispose of all waste materials generated during the Work. All waste products shall be disposed according to applicable federal, State, and local governing agencies.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- F. Any waste classified as a hazardous or toxic waste shall be disposed in the appropriate manner to a licensed hazardous waste disposal facility. Verification of proper disposal shall be submitted to the Owner upon completion of the project.
- G. Costs for disposal of contaminated materials encountered will be paid for on a time and material basis as negotiated with the Owner, unless directed otherwise by the Engineer.
- H. Maintain access for vehicular and pedestrian traffic as required for site operations and other construction activities. Utilize temporary striping, barricades, warning signs, and warning lights as required by the Town of Dracut, Dracut Public Schools, and/or other local agencies. Do not close or obstruct sidewalks, roadways, entrances/exits, hydrants, or any utilities without permits.

1.10 COORDINATION

- A. At least five (5) days prior to the start of earthwork, Contractor shall arrange an on-site meeting with the Owner and Engineer for the purpose of establishing the Contractor's schedule of operations and scheduling inspection procedures and requirements.
- B. As construction proceeds, Contractor shall be responsible for notifying the Engineer prior to the start of earthwork operations requiring inspection and/or testing.

1.11 SURVEY

- A. General: The Contractor will be responsible for, and pay all costs incurred to provide all layout of the proposed work, control of the work through construction and a final survey immediately after completion of the work. The work shall be performed by a Massachusetts-registered Land Surveyor.
- B. Construction Layout: The Contractor shall utilize the lines and benchmarks established by the Surveyor to set up whatever specific detail controls are needed for establishing location, elevation lines and grades of all the work.
- C. As-Built Measurements:
 1. As-built measurements shall be taken as the work is installed, and up to date as-built plans shall be maintained at all times.
 2. When the work is complete and accepted, the Contractor shall submit to the Engineer three (3) sets of as-built drawings including one reproducible set of drawings. These drawings shall reflect the actual measurements and locations, horizontal and vertical, of the completed work including location and inverts of all subsurface utility locations.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Ordinary Borrow (Common Fill): Friable soil; free of rubbish, ice, snow, tree stumps, roots, and organic matter; no stone greater than two-third loose lift thickness. Common Fill should have a minimum of fifteen percent (15%) and a maximum of fifty percent (50%) passing the No. 200 sieve. Material meeting Common Fill specifications may be obtained from excavations provided that unacceptable material is culled (organic soil and clay are not acceptable).

Common Fill shall be used in the following locations:

1. Under landscaped areas to twenty-four inches (24") below finish grade.
2. At locations shown on the Drawings.
3. As directed by the Engineer.

- B. Granular Fill (Selected Borrow, selected Material): Inorganic soil free of clay, loam, ice and snow, roots, sod, rubbish, and other deleterious or organic material; graded within the following limits:

| Sieve Size | Percent Finer by Weight |
|---------------------------|-------------------------|
| 2/3 Loose Lift Thickness* | 100 |
| No. 10 | 30-95 |
| No. 40 | 10-70 |
| No. 200 | 0-12** |

*Eight-inch (8") maximum

**if placed during wet weather or within three feet (3') of structure foundations or retaining walls, the percent finer by weight for the No. 200 sieve should be 0 to 8.

- C. Granular Fill shall be used in the following locations:

1. Below pavement/sidewalk subbase and base course.
2. At locations shown on the Drawings.
3. As directed by the Engineer.

- D. Sand-Gravel (Gravel Borrow): Hard, durable, natural soil; free of ice, snow, clay, shale, roots, sod, rubbish, and other deleterious or organic matter; graded within the following limits:

| Sieve Size | Percent Finer by Weight |
|------------|-------------------------|
| 3 Inch* | 100 |
| ½ Inch | 50-85 |
| No. 4 | 40-75 |
| No. 50 | 8-28 |
| No. 200 | 0-8 |

* Two-inch (2") maximum when used as pipe bedding material from six inches (6") below to six inches (6") above the pipe.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. Sand-gravel shall be used in the following locations:
1. Where placed on saturated soil subgrade (use filter fabric between subgrade and Sand-Gravel).
 2. At locations shown on the Drawings.
 3. As directed by the Engineer.
- F. Crushed Stone (3/4-inch Crushed Stone, M2.01.4, Screened Gravel): Durable crushed rock or crushed gravel stone; free of ice, snow, sand, silt, clay, loam, shale, or other deleterious matter; graded within the following limits:

| Sieve Size | Percent Finer by Weight |
|------------|-------------------------|
| 1 Inch | 100 |
| 3/4 Inch | 90-100 |
| 1/2 Inch | 10-50 |
| 3/8 Inch | 0-20 |
| No. 4 | 0-5 |

- G. Crushed Stone (3/4-inch) shall be used in the following locations:
1. Where placed on saturated soil subgrade (wrapped in filter fabric).
 2. Utility support.
 3. At locations shown on the Drawings.
 4. As directed by the Engineer.
- H. Flowable Fill: Flowable Fill shall be a cement concrete backfill material that flows like a liquid, supports like a solid when cured, and levels without tamping or vibrating to reach one hundred percent (100%) compaction. The material shall be proportioned to yield a twenty-eight-day (28-day) minimum compressive strength of two hundred pounds per square inch (200 psi) if not specified elsewhere. The material shall be produced and installed in accordance with ACI 229R, and ACI 116R, with a mix formulation to be approved prior to placement of the material in the project.
- I. Lean Concrete: Lean Concrete shall consist of a mixture of Portland cement and hard, durable mineral aggregate proportioned so that the concrete attains a minimum twenty-eight-day (28-day) compressive strength of one thousand (1,000) psi. Lean Concrete may be used as an alternative to Sand-Gravel and Crushed Stone to correct over-excavation.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- J. Sand: Free of silt, clay, loam, friable or soluble materials and organic materials. Gradations should conform to the limits indicated below or to the manufacturer's recommendations if different from that indicated herein.

| Sieve Size | Percent Finer by Weight |
|------------|-------------------------|
| ½ Inch | 100 |
| ⅜ Inch | 85-100 |
| No. 4 | 60-100 |
| No. 16 | 35-80 |
| No. 50 | 10-55 |
| No. 100 | 2-10 |

- K. Sand shall be used in the following locations:
1. Utility support.
 2. At locations shown on the Drawings
 3. As directed by the Engineer.
- L. Fill in trenches shall meet the material specified above for appropriate locations.
- M. Fill material shall be obtained from on-site sources to the extent suitable material is available and off-site material to the extent suitable material is not available from on-site sources.
- N. All soil materials to be used as backfill will be evaluated based on gradation analyses data and/or, chemical test results submitted by the Contractor to the Engineer. Materials may be rejected for use based on the results of the evaluation. Off-site materials that are rejected for use shall be removed by the Contractor at his own expense if brought to the site.
- O. Non-Woven Geotextile Fabric: Mirafi 140N filter fabric or equivalent acceptable to the Engineer.

2.2 REUSE OF EXCAVATED MATERIAL

- A. Excavated materials without chemical contamination meeting the gradation limits for fill contained herein may be segregated and reused as accepted by the Engineer. Due to high silt content, some of the on-site soils may be easily disturbed during wet/freezing conditions when subject to earthwork equipment. If weather conditions are favorable, on-site soils containing less than thirty-percent (30%) fines (i.e., less than thirty percent (30%) finer than the No. 200 sieve by weight) may be reused as a substitute for Common Fill provided that the moisture content can be controlled, and the material can be compacted to the required density.
- B. All suitable material, as determined by the Engineer, may be reused on the site, provided it meets the gradation requirements for the given materials as described in Article 2.1 and is not contaminated. All surplus material must be tested for contamination prior to leaving the project site.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION REQUIREMENTS

- A. Prior to commencing excavation activity, identify required lines, levels, contours, and datum.
- B. Notify Engineer in writing of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- C. Identify and flag known utility locations.
- D. Maintain and protect existing buildings and utilities remaining which pass through work area. Provisions for protection of utilities shall be made in accordance with the requirements of authorities having jurisdiction over those utilities.
- E. Verify fill materials to be reused are acceptable to the Engineer.
- F. Coordinate the sequence of excavation and earthwork activity with installation of lateral support systems, construction dewatering, and utility construction.
- G. Stability of excavations and job safety are the sole responsibility of the Contractor.
- H. Contractor shall design and implement construction measures to avoid disturbance to structure subgrades and maintain stable slopes. Such measures could include placement of geotextile fabric and Crushed Stone working mat, lean concrete mud mats, or other appropriate subgrade and slope stabilization measures. Measures to create and maintain stable subgrades and slopes shall be considered part of this Work and shall be provided at no additional cost to the Owner.
- I. Contractor shall employ construction methods and means that will keep airborne dust to a minimum, and remove from roadways and sidewalks, all dirt and other materials that have been spilled, washed, tracked, or otherwise deposited thereon by hauling and other operations.

3.2 PROTECTION OF ADJACENT WORK

- A. Protect all adjacent structures which may be damaged by excavation work, including service utilities and pipe chases. All construction induced damage shall be repaired by the Contractor at no additional expense to the Owner.
- B. Grade excavation top perimeter to prevent surface water run-off into excavation or to adjacent areas.
- C. Furnish, install, monitor and maintain dewatering systems, as specified in Section 312319.
- D. Furnish, install, monitor and maintain excavation support systems as specified in Section 312295.
- E. Utilities

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Support and protect from damage existing pipes, poles, wires, fences, curbing, and other structures, which the Engineer decides must be preserved in place without being temporarily or permanently relocated.
2. Restore items damaged during construction without compensation, to a condition at least equal prior to construction.

F. Trees

1. Enclose the trunks of trees adjacent to work as detailed on the Contract Drawings.
2. Employ excavating machinery and cranes of suitable type and size and operate with care to prevent injury to trees not to be cut and particularly to overhanging branches and limbs.
3. When trimming is required, make all cuts smooth and neat without splitting or crushing.
4. Cover cut areas with an application of grafting wax or tree healing paint.
5. Branches, limbs, and roots shall not be cut except by permission of the Owner.

G. Plantings

1. Protect by suitable means or temporarily replant and maintain cultivated hedges, shrubs, and plants which may be injured by the Contractor's operations.
2. Replant in their original positions and care for until growth is re-established, once the construction operations have been substantially completed.
3. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to which existed prior to the start of the Work.

H. Paved surfaces

1. Do not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels shaped as to cut or injure paved surfaces.
2. All surfaces which have been injured by the Contractor's operations shall be restored to a condition at least equal to which existed prior to start of the Work.
3. Suitable materials and methods shall be used for such restoration.

3.3 PREPARATION

A. Pavement Removal

1. Remove only existing pavement as necessary for the prosecution of the work.
2. Engineer may require that pavement be cut with pneumatic tools or saws without extra compensation to Contractor, where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
3. Dispose large of pieces of broken pavement before proceeding with excavation.

B. Topsoil Removal

1. From areas which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers

not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.

3.4 EXCAVATION

- A. Excavate all material of whatever nature encountered. Excavate in sequences and stages that will not subject permanent or temporary facilities or surfaces to unstable conditions. Excavation will not be permitted unless applicable earthwork, lateral earth support and dewatering submittals have been reviewed and accepted by the Engineer.
- B. Excavate to the lines, limits, and grades indicated. Correct unauthorized excavations at no additional cost to the Owner.
- C. Proceed with caution in the area of utilities. Expose them by hand or other excavation methods that will prevent damage. Excavation near electrical, gas, and water lines and near fiber optic telecommunication lines shall be completely hand dug within three feet of the lines.
- D. Within proposed manhole and specialty structure areas excavate all unsuitable material to the greater of five feet (5') beyond structure lines or within the area defined by planes sloping 1 horizontal to 1 vertical (1H:1V) downward and outward from exterior edges of bottom of structure down to the naturally deposited granular soils, or to the limits of the temporary excavation support. Unsuitable material is pavement, concrete, topsoil, subsoil, existing foundations and slabs from previously existing structures, organic soil and existing fill.
- E. In pavement areas, remove topsoil, organics, tree stumps and other deleterious materials within three feet (3') of finished grade. Remove other materials, including any walls, foundations, slabs, or other obstructions to at least three feet (3') of finished grade. Existing pavement may remain in paved areas provided it is broken up or crushed.
- F. All excavations shall be performed "in the dry" and shall be accomplished by methods that preserve the undisturbed state of subgrade soils. The subgrade shall be dewatered to at least two feet (2') below the bottom of the excavation prior to any structure excavation as specified herein and in Section 312319. The groundwater level outside the excavation shall not be lowered more than three and one-half feet (3.5') at a distance of twenty feet (20') from the face of the excavation.
- G. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced as specified herein at no additional cost to the Owner.
- H. Limit the size of the excavation to the area that the proposed dewatering system is capable of dewatering as specified herein and in Section 312319.
- I. Use a construction procedure that permits visual identification of subgrades. Do not excavate within a 2H:1V line extending downward and outward from the bottom of existing footings/foundation walls/slabs of adjacent buildings. Protect slopes adjacent and below existing footings from erosion and stormwater runoff.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- J. Carry out excavation in such a manner as to minimize movements of excavation support systems and prevent damage to adjacent buildings, structures, roadways, walkways and utilities. If excavation support system wall movements become excessive or slopes become unstable, as determined by the Engineer, the Contractor shall immediately and temporarily cease all excavation activities and be prepared to implement measures to mitigate further movement. All delays, materials and equipment necessary to proceed as described will be at no additional cost to the Owner.
- K. Fill over-excavated areas in accordance with specifications at Contractor's expense.
- L. Geotextile fabric shall not be laid in a stretched condition but laid loosely. Panels shall be overlapped by a length of three feet (3') at the ends and 1 foot along the edge, where required or unless otherwise shown on the Drawings. Filter fabric damaged or displaced before or during placement of overlying layers, shall be replaced or repaired at no additional cost to the Owner or Engineer.
- M. Promptly notify the Owner and Engineer when any subsurface condition or facilities are encountered that interfere with construction, such as utility lines, boulders or chemical contamination.
- N. Stockpiling of Material: Establish material stockpiles on site only at locations that will not interfere with the progress of the Work. Off-site stockpiling and rehandling, if required, shall be the responsibility of the Contractor, at no additional expense to the Owner. Such off-site stockpiling shall require written permission from the Owner.

3.5 TRENCH EXCAVATION

- A. Excavate for any necessary piping to the minimum limits shown on the Drawings.
- B. Trench excavation shall be defined as any excavation in which the bottom width does not exceed seven feet (7') and the width does not exceed twice the depth measured on the lowest side of the trench.
- C. Cut trenches sufficiently wide to enable installation and inspection of utilities. Slope trench sides or shore trenches in accordance with OSHA standards.
- D. Trench excavation shall include the removal of all materials encountered. During excavation, materials determined to be suitable for backfilling shall be stockpiled off site or if allowed by the Engineer, in an orderly manner a sufficient distance from the edges of the trench to avoid overloading and to prevent slides or cave-ins.
- E. Hand trim excavation and leave free of loose matter. If the material at or below the limits of excavation is unsuitable, notify the Engineer immediately and cease excavation in this area until the Engineer's instructions are received.
- F. Where a pipe is to be laid directly on the trench bottom, final excavation at the bottom of trench shall be performed manually, shaped to fully support the utility upon undisturbed material or compacted Sand-Gravel Fill.

- G. Excavations for manholes, catch basins, and miscellaneous site structures shall provide twelve-inch (12") minimum clearance on all sides.
- H. Support pipe and conduit during placement and compaction of bedding fill.
- I. Backfill trenches to required contours and elevations.
- J. Where an obstruction is encountered in utility trench excavation and deemed by the Engineer to remain in place, carry the trench excavation six inches (6") below the required elevation and backfill in a six-inch (6") layer of three-quarter inch ($\frac{3}{4}$ ") Crushed Stone prior to installing the pipe.

3.6 SUBGRADE PREPARATION

- A. Protect all subgrade soils. Perform excavation near subgrades using smooth-faced bucket or with hand tools. After final subgrade has been observed and accepted by the Engineer, Sand-Gravel, mud mat (lean concrete) or Crushed Stone wrapped in filter fabric may be required to stabilize footing subgrades. If required by the Engineer, stabilization materials shall be placed as soon as practical and at no additional cost to the Owner.
- B. Do not excavate to full depth when freezing temperatures may be expected unless subgrade is protected from freezing or footings or slabs can be placed immediately after excavation is completed and are protected from freezing.
- C. Proofrolling: Prior to placing utilities or backfilling in paved areas and below structures, compact the surfaces with eight (8) passes of a walk-behind vibratory drum roller or vibratory plate compactor acceptable to the Engineer.
- D. Weakened or unstable areas that are observed during proof-rolling shall be overexcavated and replaced with compacted Sand-Gravel, Crushed Stone or Lean Concrete as specified herein.
- E. When near or below the water table, proof-rolling should be at the discretion of the Engineer and should be performed using static (non-vibratory) equipment.
- F. All proof-rolling of subgrades must be observed and accepted by the Engineer prior to placement of any backfill or foundation.
- G. No construction equipment other than that used for placement and compaction of fill shall be allowed on any final subgrade and previously placed fill unless authorized by the Engineer.
- H. Subgrade soils which become disturbed because of inappropriate operations on the part of the Contractor shall be recompacted or removed completely and replaced with Sand-Gravel, Crushed Stone or Lean Concrete. The necessity and extent of such removal shall be determined by the Engineer and shall be entirely at the Contractor's expense.
- I. To stabilize subgrades below the water table, a working mat of three inches (3") of lean concrete or six inches (6") of Crushed Stone wrapped in filter fabric may be required to stabilize the bottom of the excavation and provide a firm base for compaction of fill above it. If the

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

Contractor will be pumping from these materials, they must be properly filtered to prevent migration of fines.

3.7 BACKFILLING

- A. After approval of subgrade by the Engineer, backfill areas to contours and elevations with specified materials.
- B. Backfill shall not contain frozen lumps nor be placed on frozen ground.
- C. Systematically backfill in layers and compact each layer according to Article 3.8. In confined areas place six-inch (6") loose lifts and compact with at least four (4) passes of approved manually operated powered vibratory plate or drum compactor. Maintain fill materials with a uniform moisture content, with no visible wet or dry streaking. The final filled soil mass shall be as uniform as practical in material characteristics, lift thickness, moisture content, and compactive effort required.
- D. Do not commence backfilling operations of utility trenches until all piping, etc., has been installed, inspected, and approved and the locations of all pipe and appurtenances have been recorded. Hand backfill carefully around pipes using materials specified herein and tamping firmly in layers, compacting by hand-rammers or mechanical tampers. When a manufacturer or utility owner suggests backfill materials and methods other than those specified herein, such requirements shall govern, providing the finished work equals or exceeds the result obtained by the material and methods specified herein.
- E. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- F. Grade and compact fill surface to readily shed water. All fill is to be placed in-the-dry.
- G. Where horizontal layers meet a naturally rising slope, key layer into slope by benching into the slope.
- H. Employ placement method that does not disturb or damage foundations, utilities, underslab and perimeter drain systems, waterproofing, existing structures or utilities in trenches.
- I. Maintain range of optimum moisture content of backfill materials to attain required compaction density. If wet fill cannot be adequately compacted within twenty-four (24) hours of placement, remove and replace with drier fill.
- J. Where backfill of buried walls or utilities is only on one side, only hand-operated rollers or plate compactors should be used within a lateral distance of five feet (5') of the back of the wall or utility.
- K. Crushed Stone placed below the water table shall be wrapped all-around in non-woven geotextile filter fabric, unless otherwise directed by the Engineer.

3.8 COMPACTION

- A. In-place compaction testing will be performed in accordance with ASTM D1556 or ASTM D6938. Allow the Engineer sufficient time to make necessary observations and tests.
- B. All percent compactations are referenced to the maximum dry density of the soil as determined in accordance with ASTM D1557.
- C. The degree of compaction for fill placed in various areas shall be as follows:

| Area | Minimum Degree of Compaction |
|---|------------------------------|
| Below utilities and specialty structures | 95% |
| Pavement/sidewalk subbase and base course | 95% |
| Below pavement/sidewalk subbase and base course | 95% |
| Trench backfill | 95% |
| Common Fill within the top three feet (3') of grade in landscaped areas | 90% |
| Landscaped areas below three feet (3') from final grade | 85% |

- D. Crushed stone shall be compacted using minimal effort to a firm stable configuration and as directed by the Engineer.
- E. The compaction alternatives given below are stated to provide minimum compaction standards only and in no way relieve the Contractor of his obligation to achieve the above-specified degree of compaction by whatever additional effort is necessary:

* And no more than two-thirds (2/3) loose lift thickness.

If field density testing indicates Work does not meet specified requirements, remove Work (or recompact where appropriate), replace and retest at the expense of the Contractor.

- F. Where utility facilities are supported in place, use equipment and techniques as required to achieve the specified compaction under and around them. When a pipe manufacturer or utility owner suggests backfill materials and methods other than those specified herein, such requirements shall govern, provided that the Engineer agrees that the finished work equals or exceeds the result obtained using the material and methods specified herein. Uniformly compact into confined areas. Use flowable fill where specified or directed.
- G. Protect fill by grading to drain and providing a smooth surface that will readily shed water. Grade the surface of the areas in such a manner as to prevent ponding of surface runoff water in areas to receive compacted fill. All fill is to be placed "in-the-dry".
- H. To the extent practicable, each layer of fill shall be compacted to the specified density the same day it is placed.
- I. Fill that is too wet for proper compaction shall be removed within forty-eight (48) hours of placement or be disced, harrowed, mixed with drier material or otherwise dried to a proper moisture content for compaction to the required density.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- J. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.
- K. Fill that becomes disturbed after compaction as a result of the Contractor's operations shall be removed and replaced or recompacted to the specified degree of compaction at the Contractor's expense.
- L. Crushed Stone shall be compacted with four (4) passes of approved compaction equipment.

3.9 DEWATERING

- A. Groundwater levels will normally vary with precipitation and from season to season.
- B. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed condition of the subgrade soils at proposed bottom of excavation. Refer to the requirements of Section 312319 – Dewatering.

3.10 EXCAVATION SUPPORT SYSTEMS

- A. Provide shoring, sheeting, and/or bracing of excavations in accordance with Section 312295 and approved submittals. It is the Contractor's sole responsibility to assure complete safety against collapse of excavations. Protect excavations to prevent cave-in or loose soil from falling into excavation. Where possible, Contractor may elect to open-cut certain areas of the required excavation. The Contractor shall be totally and solely responsible for the design of temporary shoring and side slopes.
- B. Comply with local safety regulations and with the provisions of the Occupational Safety and Health Act (OSHA) for trenching and excavation, whichever are more stringent. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state and federal safety regulations. Specifically, the current OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 should be followed. It is our understanding that these regulations are strictly enforced by OSHA.
- C. The Contractor's "responsible person," as defined in 29 CFR Part 1926, will evaluate the soil exposed in the excavations as part of the Contractor's safety procedures. If an excavation, including a trench, is extended to a depth of more than twenty feet (20'), the Contractor will engage a Professional Engineer registered in the Commonwealth of Massachusetts to design the slopes and/or shoring required for the excavation.
- D. The Contractor's "responsible person" will establish a minimum lateral distance from the crest of the slope for all vehicles and spoil piles. Likewise, the Contractor's "responsible person" will establish protective measures for exposed slope faces.
- E. Except as shown on the Drawings or as directed by the Engineer, remove lateral earth support system components as backfilling operations progress, taking all necessary precautions to prevent collapse of excavation sides and protect adjacent roadways, walkways, utilities and structures.

- F. The Contractor shall be fully responsible for furnishing, installing, maintaining, reinforcing, removal and non-removal of all lateral earth support system components and shall be fully responsible for all damages, losses and claims involving the use or non-use of excavation support systems despite any orders given or any orders failed to be given by the Engineer. The Contractor shall hold harmless the Engineer and Owner from all damages, losses and claims involving the use or non-use of excavation support systems.
- G. The Contractor shall furnish, put in place, and maintain excavation support systems to support the vertical sides of excavations, to limit movements and which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent roadways, walkways, utilities and structures from disturbance, undermining or other damage.
- H. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the excavation support system, but if voids are formed, they shall be immediately filled and rammed.
- I. Removal of Excavation Support Systems
 - 1. The Contractor shall leave in place to be embedded in the backfill all metal components of the excavation support wall below a depth of five feet (5') below finish grade and as directed by the Engineer for the purpose of preventing injury to structures, utilities or property, whether public or private. The Engineer may direct that components used for excavation support be cut off at specified elevations. No payment will be made by the Owner for such sheeting and shoring and bracing left in place.
 - 2. All components of the excavation support system not left in place shall be carefully removed in such a manner as not to compromise the construction process or the integrity of adjacent structures, utilities, or property. All voids left or caused by withdrawal of excavation support system components shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, or otherwise as may be directed.

3.11 TOLERANCES

- A. Top Surface of Exposed Subgrade: Plus or minus one inch (1").
- B. Top of Topsoil: Plus or minus one-half inch (1/2").

3.12 FIELD QUALITY CONTROL

- A. Placement and compaction of fill within specialty structures and beneath paved areas will be observed and tested by the Engineer. At least one (1) field density test will be performed for each five hundred (500) cubic yards of fill and one (1) for each lift of fill placed.
- B. Testing and analysis of fill materials will be performed in accordance with ASTM D422 and ASTM D1557.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. In-place compaction testing will be performed in accordance with ASTM D6938.
- D. Provide the Engineer with free and safe access to Work at all times.
- E. The presence of the Engineer does not include supervision or direction of the actual Work by the Contractor. Neither the presence of the Engineer nor any observation and testing performed by the Engineer, nor any notice or failure to give notice, shall excuse the Contractor from defects in his Work.
- F. Any retesting that must be performed due to non-compliance with this specification shall be at the expense of the Contractor and at no additional expense to the Owner.

3.13 DISPOSAL OF SURPLUS EXCAVATED MATERIALS

- A. No excavated materials shall be removed from the site of the work or disposed of by the Contractor except as directed or permitted by the Engineer. All material to be disposed of off site must be tested for contaminants and approved by the Owner prior to being removed from site.
- B. Surplus excavated materials suitable for backfill shall be used to backfill normal excavations or to replace other materials unacceptable for use as backfill; shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes within a haul of three (3) miles from the point of excavation; all as directed or permitted by the Owner and without additional compensation.
- C. Surplus excavated materials not needed as specified above shall be hauled away and disposed of by the Contractor, at his expense, at appropriate locations, and in accordance with local, State and federal regulations.

END OF SECTION

SECTION 312295

SUPPORT OF EXCAVATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Designing, furnishing, installing, and removing or abandoning in-place Excavation Support Systems for installation of manholes, waterproofing, concrete tunnels, walls and various utilities as shown on the Drawings and as specified in this Section, which, without limiting the generality thereof, includes procurement and payment for all permits and licenses required to complete the Work specified herein and shown on the Drawings.

1.2 RELATED SECTIONS

- A. Section 013300 – Submittals
- B. Section 312200 – Earthwork
- C. Section 312319 – Dewatering

1.3 DESIGN AND PERFORMANCE RESPONSIBILITY

- A. The Contractor shall be fully responsible for providing complete and adequately designed excavation support systems as required and/or directed by the Engineer in accordance with the provisions set forth herein.
- B. The Contractor shall engage, at his own expense, the services of a qualified Professional Engineer, hereinafter referred to as the "Contractor's Engineer," registered in the Commonwealth of Massachusetts, and with at least ten (10) years of demonstrated experience for the design of all excavation support system components required to accomplish the Work, and for supervising the proper on-site installation associated therewith.
- C. The Contractor's attention is directed to the fact the acceptance of the Contractor's Engineer and/or his/her qualifications by the Owner and/or Engineer shall not be construed as an approval of the design and methods of construction employed by the Contractor during execution of the Work. It being understood that all requirements necessary to accomplish the Work specified and/or indicated on the Drawings shall be designed by and installed under the direct supervision of the Contractor who shall ultimately and solely bear the responsibility for that Work.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with OSHA – Construction Standards for Excavations, 29 CFR Part 1926.650-1926.652. Maintain one copy on site.
- B. The Contractor or his subcontractor and the field supervisory personnel shall have at least ten (10) years of experience with excavation support systems similar to those used in this work and specified herein.
- C. The Contractor's Engineer shall be a Professional Engineer registered in the Commonwealth of Massachusetts and shall have at least ten (10) years of experience in responsible charge with excavation support systems similar to those used in this Work and specified herein.

1.5 SUBMITTALS

- A. Excavation support system designs and calculations shall be prepared, stamped and signed by the Contractor's Engineer. System design and calculations should include loading diagrams and performance criteria for support wall deflections, movements outside the excavation, and estimates of the amount of lowering of the water table outside the excavation. System design should accommodate support of existing utilities that will remain through excavations. System design should account for all traffic and construction surcharge loading conditions, including all microtunneling equipment and materials staged adjacent to the pits.
- B. All Submittals must be submitted at least three (3) weeks prior to start of any excavation support activity. Excavation activities shall not start until all submittals for Support of Excavation as specified in Section 312295, Dewatering as specified in Section 312319, and Earthwork as specified in Section 312200 are reviewed and accepted by the Engineer.
- C. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material proposed for use in Excavation Support Systems.
- D. Method of installing the excavation support system components: The Contractor shall modify installation methods if directed by the Engineer in order to maintain movements or groundwater levels as required.
- E. Submit descriptive data and operating procedures for all equipment to be used. This shall include, at a minimum, machinery required to install sheeting, soldier piles, tangent or secant piles, grouting, excavate soil and rock, remove obstructions (if required), and dewatering. Submit all pertinent data including sizes, weights, capacities, and operating frequencies.
- F. Submit the Contractor's and/or subcontractor's, the Contractor Engineer's, and field supervisory personnel's qualifications, including examples of five (5) similar projects they have worked on as a person in responsible charge. The qualifications submittals shall clearly demonstrate a minimum of ten (10) years of experience with similar types of excavation support as required by Article 1.4.

- G. The specified time for review of the submittals is the minimum required to review, evaluate and respond to the Contractor. If, after review, resubmission is required, the specified time period(s) shall commence upon the date of receipt of the resubmittals. The Contractor is responsible for scheduling specified submittals and resubmittals so as not to impact the progress of the Work.
- H. Notwithstanding review and comment by the Owner's Engineer, the Contractor shall remain solely responsible for the adequacy and safety of the materials and methods used in construction.

1.6 PROJECT CONDITIONS

- A. The Contractor shall ensure that the adjacent roadways/sidewalks will remain open during installation of the excavation support system. The Contractor shall be responsible for obtaining the necessary police details and permits, etc. when conducting activities which infringe on said roadways/sidewalks. The Contractor shall also be responsible for implementing all necessary traffic control measures, which may include, but not be limited to, traffic cones, barrels, signs and additional police details in accordance with Section 015000.
- B. Proceed with caution in areas of below ground utilities and structures. Expose them by hand excavation, vacuum excavation, or by other methods acceptable to the Owner and the utility owner. The Contractor is responsible for any damage to utilities caused by the Contractor's operations. Damaged utilities shall be repaired by the Contractor to equal or better condition at no additional cost to the Owner.
- C. Verify field dimensions of available work space, both areal and vertical, including interference with existing overhead utility lines.
- D. Protect existing utilities to remain. If existing utilities which have not been designated for relocation interfere with the proposed method of support, immediately notify the Engineer.

1.7 SUBSURFACE DATA

- A. Review logs of subsurface explorations and other pertinent data for the site. After obtaining Owner's permission, take whatever additional subsurface explorations deemed necessary by the Contractor at no expense to the Owner.
- B. The aforementioned data is for general information and is accurate only at the particular locations and times the subsurface explorations were made. It is the Contractor's responsibility to make interpretations and draw conclusions based on the character of materials to be encountered and the impact on his work based on his expert knowledge of the area and of earthwork techniques.
- C. By submitting a Bid, the Contractor affirms that the site and conditions affecting the Work under this Section have been carefully examined. No claim for additional costs will be allowed which stem from a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation at the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials, whether new or used, shall be sound and free of defects that might impair their suitability for intended use.
- B. Timber Left in Place: Treated and cured per appropriate AWPA standards. Sheeted timber left in place shall be cut to five feet (5') below grade level.
- C. Support Walls, Bracing, Hardware and Fastenings: The Contractor shall provide certificates for all components used in earth support systems verifying they are of the strength and dimensions necessary to satisfactorily withstand the loads to which they will be subjected. The Contractor shall provide manufacturer's cut sheets for all hardware and fastenings necessary for the satisfactory installation of excavation support systems.

PART 3 - EXECUTION

3.1 EXCAVATION SUPPORT INSTALLATION

- A. Install, monitor, and remove Excavation Support Systems in accordance with the Drawings and Specification Sections 312200, and 312295. Install, maintain, and remove as required, excavation support in a manner to prevent loss of ground, removal of soil fines from the adjacent ground, damage to or excessive movement of adjacent structures and utilities and to limit wall movements and settlements.
- B. Identify required lines, levels, contours, and datum locations. Locate, identify, and protect from damage utilities that remain.
- C. Installation of soldier piles and other elements of the excavation support systems may require work near existing overhead utility lines. Coordinate equipment and operation so that no portion of the equipment will come in contact with overhead wires, or within distances allowed by utility companies for safety purposes. Coordinate work with utility owners.
- D. Vacuum excavation shall be performed prior to installing vertical excavation support system elements within five feet (5') of existing utilities.
- E. Soldier piles, if used, shall be installed in pre-bored holes. Encase the soldier piles within the drilled holes with low strength flowable fill with a minimum compressive strength of 50 to 80 psi as specified in Section 312200.
- F. If soldier pile and lagging is used, do not excavate more than four feet (4') in advance of lagging installation. Lagging shall be installed against the soldier pile flanges and a layer of geotextile (Mirafi 140N or equivalent) placed at the back (soil) face. Lagging shall be immediately backfilled against the soil by placing fill between the lagging and excavated face of the soil such that all voids are filled. Piles shall be removed in accordance with Section 312200.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

Cut-off soldier piles a minimum of five feet (5') below grade and backfill the excavation with Flowable Fill as specified in Section 312200.

- G. Bracing shall not be removed until backfill has been placed and compacted to the required density to within two feet (2') of the bottom of the support to be removed.
- H. Accurately record actual locations of utilities encountered during installation of the system by horizontal dimensions, elevations or inverts, and slope gradients.
- I. Protect existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

END OF SECTION

SECTION 312300
TRENCH EXCAVATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This work shall consist of the removal of all materials, excavation, dewatering, flow diversion, and disposal of surplus or unsuitable materials unnecessary and as designated on the Drawings and as shown in plan, profile, cross-section and trench details.
- B. It shall include the removal of all earth, muck, mud, swamp, bog, hardpan, loose, disintegrated or decomposed ledge rock, topsoil and sod. It shall additionally include the removal of all rock, fragmented rock, boulders, concrete and cement structures, manhole and inlets damaged or repaired utilities. Rock and Ledge Rock shall be classified as all rock materials measuring two (2) cubic yards or greater in longest dimension. Excavation of Rock and Ledge Rock shall be paid separately under the pay item for Rock and Ledge Rock removal and disposal.
- C. There is no separate pay item for Trench Excavation. This item shall be included in the cost of the pipe and structure installations.

1.3 CONSTRUCTION REQUIREMENTS

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 12 inches of clearance on both sides of pipe or conduit or as shown on plans.
- B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil.
 - 1. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed #8 AASHTO stone prior to installation of pipe.
- C. The Contractor shall notify the ENGINEER after excavations are completed and prior to installation of pipe and structures. No masonry, pipe or other material shall be placed in the excavated area until the ENGINEER has approved the depth of excavation and the character of the sub-grade materials.
- D. The length of trench opened at one time shall not exceed 100 feet or such length as the

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

ENGINEER considers reasonable and necessary.

- E. The Contractor shall at all times keep the excavation free from water. The water shall be pumped and disposed of by the Contractor to the ground surface in a clean state, free of sediment and debris and shall not pool or pond in areas beyond the work zone. Discharge of water from the trench shall comply with Federal, State, and local stormwater quality standards in effect at the time of the work.
- F. The Contractor shall provide all necessary pumps, dams, drains, ditches, flumes, well points and other means for excluding and removing water from trenches, tunnels and other parts of work and for preventing the slopes from sliding or caving. The Contractor shall sufficiently dewater all trenches to completely dry out and solidify the foundation below the bottom of the pipe/structure to whatever depth is necessary below the bottom of the pipe/structure to provide a firm, solid, completely dry foundation on which to lay the pipe or construct the structure.
- G. Construction requirements for placing various backfill materials can be found elsewhere within these specifications.

- END OF SECTION -

SECTION 312319

DEWATERING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, and equipment necessary to complete the Work shown on the Drawings and as specified in this Section, which, without limiting the generality thereof, includes:
 - 1. Designing, furnishing, installing, operating, monitoring, maintaining and removing a temporary dewatering and drainage system as necessary to control water levels and hydrostatic pressures, in order to permit construction to occur “in the dry” and maintain stable subgrades.
 - 2. Procurement and payment for all permits and licenses required to complete the Work specified herein and shown on the Drawings.
 - 3. Providing, maintaining, and removal of temporary surface control devices used to mitigate inflow of surface water into excavations or other prepared subgrades.
 - 4. Installing, protecting and maintaining groundwater observation wells used to monitor the performance of dewatering systems.
 - 5. Proper disposal of all discharge water and compliance with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to the Town of Dracut and the Commonwealth of Massachusetts. All labor, materials, equipment and services necessary to make work comply with such requirements shall be provided without additional cost to the Owner.

1.2 RELATED SECTIONS

- A. Section 013300 – Submittals
- B. Section 312200 – Earthwork
- C. Section 312295 – Support of Excavation

1.3 DESIGN AND PERFORMANCE RESPONSIBILITY

- A. The Contractor shall be solely responsible for the adequacy of the dewatering systems and for selecting and operating the dewatering systems.
- B. The primary purpose of groundwater control is to lower the groundwater level to preserve the undisturbed bearing capacity of subgrade soils in the excavated areas. The Contractor shall lower the groundwater to at least two feet (2') below the bottom of any part of the excavation prior to any excavation within the structure footprint. Additional groundwater lowering may be

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

necessary beyond the two-foot (2') requirement to preserve the undisturbed bearing capacity of the subgrade soils depending on construction methods and equipment used and on the prevailing groundwater and soil conditions. The Contractor is responsible for lowering the groundwater level to whatever level is dictated by the selected construction methods and by site conditions, at no additional cost to the Owner.

- C. The Contractor shall be solely responsible for any damage to adjacent properties, buildings, structures, utilities, and other facilities caused by the dewatering operations. Any damage caused by the dewatering operations will be repaired at no additional cost to the Owner. Locate dewatering facilities where they will not interfere with existing utilities, facilities and/or construction work to be done under this Contract.
- D. The Contractor shall remain solely responsible for the adequacy and safety of materials and methods used in construction. Modify the groundwater control system as required to suit field conditions.
- E. Do not connect to existing drains on or off-site without obtaining permission in writing from the governing agency. Check the capacity of the existing drain before making any connections.
- F. The Contractor shall provide adequate backup power to be able to operate the dewatering system at all times.
- G. The Contractor shall be responsible for obtaining all necessary permits from State and local authorities regarding the operation and discharge of the dewatering system, and to conduct all necessary sampling and testing that may be required by those authorities at no additional cost to the Owner.

1.4 SUBMITTALS

- A. Dewatering system designs and calculations shall be prepared, stamped and signed by a licensed professional engineer, registered in the Commonwealth of Massachusetts, having a minimum of five (5) years of professional experience in the design and construction of similar dewatering and drainage systems.
- B. At least five (5) weeks prior to the installation of the dewatering system, submit complete plans for dewatering systems. The dewatering submittal shall include:
 1. A plan that shows the arrangement, location and depths of the proposed dewatering system components including observation wells.
 2. Discharge points and sedimentation basin/recharge pit details and a contingency plan in the event that permitted water quality criteria of the discharge are exceeded.
 3. A complete description of the equipment and materials to be used and the procedures to be followed in installation, operation, maintenance and abandonment procedures in relation to the proposed sequence of excavation. Include description of backup generator, supplemental pumps, and type and size of filters.
 4. Details of well development and methods to check discharge to ensure that fine-grained soils are not being pumped.

5. A complete description of the observation wells including equipment, drilling methods, holes sizes, filter sand placement techniques, sealing materials, development techniques, etc.
 6. A complete set of dewatering calculations which shall include estimates of drawdown adjacent to the excavation for specialty structures and anticipated flow rates.
- C. Elevations of top of well riser, top of protective casing or road box and ground surface elevation, along with plan locations shall be submitted within three (3) days of installation of each monitoring well. The plan locations shall show limits of excavation support systems or trenches, project stationing and adjacent prominent site features. The surveys shall be performed by a Professional Land Surveyor registered in the Commonwealth of Massachusetts.
- D. Submit qualifications for the Contractor and the Contractor's engineer responsible for designing the dewatering system. Include examples of five (5) similar projects. The field personnel supervising the dewatering system installation, operation and maintenance shall have a minimum of five (5) years of experience with similar types of groundwater control systems. If the Contractor does not have personnel with the required groundwater control experience, he/she shall retain one or more, as required, experienced specialists to design and oversee the installation and operation of the groundwater control facilities. The qualifications of the specialty firm shall be submitted to the Engineer for review.
- E. The specified time for review of the submittals is the minimum required to review, evaluate and respond to the Contractor. If, after review, resubmission is required, the specified time period(s) shall commence upon the date of receipt of the resubmittals. The Contractor is responsible for scheduling specified submittals and resubmittals so as not to impact the progress of the Work.
- F. Coordinate dewatering submittals with the excavation and excavation support submittals. Do not proceed with any excavation until submittals for dewatering, excavation, and excavation support have been reviewed and accepted by the Engineer.
- G. Submit copies of all groundwater discharge permits or written approval obtained by the Contractor for proposed methods of discharge.

1.5 DEFINITIONS

- A. The phrase "in-the-dry" used in this Section shall be defined as an excavation subgrade where the groundwater level has been lowered to at least two feet (2') below the lowest level of the excavation, is stable with no ponded water, mud, or muck, is able to support construction equipment without rutting or disturbance and is suitable for the placement and compaction of fill material, utilities, or concrete foundations.

1.6 PROJECT CONDITIONS

- A. Visit the site to review all details of the work and working conditions and to verify dimensions in the field. Notify the Engineer in writing of any discrepancy before performing any work.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. Consult official records of existing utilities and structures, both surface and subsurface, and their connection to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.
- C. Protect existing utilities to remain within the work area in accordance with the requirements of authorities having jurisdiction over same.
- D. Notify the Engineer in writing if unexpected subsurface conditions are encountered.

1.7 SUBSURFACE DATA

- A. Review any available logs of subsurface explorations and other pertinent data for the site. After obtaining Owner's permission, take whatever additional subsurface explorations deemed necessary by the Contractor at no expense to the Owner.
- B. The aforementioned data is for general information and is accurate only at the particular locations and times the subsurface explorations were made and samples collected. It is the Contractor's responsibility to make interpretations and draw conclusions based on the character of materials to be encountered and the impact on his work based on his expert knowledge of the area and of earthwork techniques.
- C. By submitting a Bid, the Contractor affirms that the site and conditions affecting the Work under this Section have been carefully examined. No claim for additional costs will be allowed which stem from a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation at the site.

1.8 COORDINATION

- A. At least five (5) days prior to the start of dewatering, the Contractor shall arrange an on-site meeting with the Owner, and the Owner's Engineers for the purpose of establishing the Contractor's schedule of operations and scheduling inspection procedures and requirements.
- B. As construction proceeds, Contractor shall keep the Engineer advised, in writing, of changes made to accommodate field conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Refer to Specification Section 312200.

PART 3 - EXECUTION

3.1 EXCAVATION DEWATERING

- A. Dewater to maintain groundwater levels within the excavation at least two feet (2') below the bottom of excavation at all times or as required lower the groundwater level to a sufficient depth in order to provide a stable subgrade. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed condition of the subgrade soils at the proposed bottom of excavation. Grade top perimeter of excavations to prevent surface water run-off.
- B. If there are indications of an upward hydraulic gradient causing uncontrolled flow or seepage, or ground instability, or erosion of soil into the excavation, the Contractor shall stop work and take whatever measures that are necessary to increase the capacity of the dewatering system or take other supplementary measures to control the groundwater to prevent further instability and loss of ground.
- C. The Contractor shall evaluate the subsurface conditions including groundwater levels when developing his means and methods. Dewatering system designs must be coordinated with excavation and excavation support designs. Where excavations are expected to extend below observed groundwater levels, dewatering of the area will be required prior to extending excavations below groundwater levels. The groundwater level must be maintained at a level to mitigate disturbance of the subgrade soils and to prevent flotation of proposed structure(s). It is expected that the dewatering system may require modifications (i.e., spacing of dewatering units, depths of sumps/screens, etc.) based on the actual soil/water conditions at a particular location across the site.
- D. The design, development and operation of deep wells, well points, sumps and any other groundwater control system components must include provisions to prevent the loss of fines from surrounding soils. Properly designed filters shall be used to prevent passage of fines from surrounding soils. Discharges should be checked each shift to verify that fines are not being pumped.
- E. If used, installation of well point systems shall be performed under the supervision of a qualified representative of the well point equipment supplier.
- F. The dewatering operations shall be designed and implemented such that no damage or settlement is caused to adjacent properties, structures and utilities.
- G. Locate all dewatering system elements where they will not interfere with construction activities within or adjacent to the work area.
- H. It is anticipated that dewatering within certain areas of the project will require 24 hour per day operation. The Contractor shall provide backup power generation and groundwater control system components and develop contingency plans to maintain continuous, uninterrupted surface water control and dewatering operations.
- I. Where completed structures are below the natural groundwater level, the Contractor shall maintain groundwater below completed portions of structures such that uplift pressure on

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

completed portions of the structure does not exceed 80 percent (80%) of the downward pressure produced by the dead weight of the structure in place.

3.2 SURFACE WATER CONTROL

- A. Surface water shall not be permitted to flow into excavations. The Contractor shall construct dikes, ditches, sumps, etc. as necessary to accomplish this task.

3.3 EXCAVATION DEWATERING

- A. The dewatering system shall be installed and operational prior to the start of any excavation below groundwater level. Observation wells shall be installed as specified in this Section prior to excavation. It is the Contractors responsibility to demonstrate to the Engineer that the proposed dewatering system is capable of adequately maintaining the groundwater level as specified in this Section and in Section 312295. The dewatering systems and the excavation support systems shall be modified, if required, to maintain such capability, prior to any excavation taking place below groundwater level, at no additional cost to the Owner.

3.4 DISPOSAL OF WATER

- A. The Contractor shall take all necessary precautions to prevent flow or seepage back into the excavation. The Contractor shall preclude the accidental discharge of fuel, oil, etc., in order to prevent adverse effects on groundwater quality.
- B. All handling and disposal of groundwater shall be in accordance with regulations set forth by federal, State, and local agencies.
- C. Disposal, treatment, and discharge methods for pumped groundwater shall be determined by the Contractor. Use of fractionation or settling tanks for discharge to storm drains is required. The Contractor shall provide all necessary permits and piping for discharge from the sedimentation basins to the storm drain system. The Contractor is responsible for all permits and treatment of groundwater (if required). The Contractor shall operate pumps and sedimentation basins in such a manner as to comply with the requirements of discharge permits. If necessary, the Contractor shall provide additional tanks and/or other mitigating measures at no additional cost to the Owner.

3.5 REMOVAL OF SYSTEMS

- A. At the completion of the excavation and backfilling work, and when approved by the Engineer, all sumps, deep wells, well points, pumps, generators, observation wells, other equipment and accessories used for the surface water control and dewatering systems shall be removed from the site. All materials and equipment shall remain the property of the Contractor. All areas disturbed by the installation and removal of groundwater control systems and observation wells shall be restored to their original condition.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. Leave in place any casings for deep wells, well points or observation wells where removal would result in ground movements that could cause damage to the adjacent structures or utilities or as directed by the Engineer.
- C. Where sumps are removed, holes shall be backfilled with compacted fill or other material accepted by the Geotechnical Engineer, in a controlled manner as specified in Section 312200. Where casings are removed, holes shall be filled with flowable fill, cement grout or sand.
- D. Dewatering elements that are left in place, as directed by the Engineer, shall be filled with cement grout and cut off a minimum of three feet (3') below finished ground level.
- E. When directed by the Engineer, observation wells should be left in place for continued monitoring. The Contractor shall provide protective devices that are suitable for traffic and for any other conditions to which the observation wells will be exposed as necessary.

END OF SECTION

**SECTION 312400
ROCK EXCAVATION**

PART 1 - GENERAL

1.1 GENERAL

- A. All rock excavation and boulder removal required for this project shall be the responsibility of the Contractor.

1.2 CONTRACT DOCUMENTS

- A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

1.3 WORK INCLUDED

- A. Removing all rock required during excavation to complete the project including, but not limited to, new manhole structures, catch basins, drain manholes, pipe, and utilities.
- B. Use of explosives is prohibited on the project. Mechanical and/or chemical methods may be used with prior approval by the engineer.

1.4 DEFINITIONS

- A. Rock (Definition): Solid mineral material with a volume exceeding two (2) cubic yards in open excavations and in trenches or solid material that cannot be removed with a 3/4 cubic yard capacity power shovel without hammering or drilling and splitting.
- B. Boulders (Definition): Loose rock material with a volume exceeding two (2) cubic yards in open excavations and in trenches encountered during the prosecution of the Work.

1.5 ASSOCIATED WORK SPECIFIED ELSEWHERE

- A. The following items appurtenant to the work are a part of the contract work specified under other sections of these specifications but are mentioned here for cross reference purposes.
 1. Dewatering – Section 312319
 2. Trench Excavation – Section 312300

1.6 PROJECT CONDITIONS

- A. Protect nearby structures, pavement, and utilities from damage during excavation and removal of Rock and Boulders. All construction induced damage shall be repaired by the CONTRACTOR at no additional expense to the OWNER.
- B. Perform hammering and mechanical splitting work only during the normal work hours permitted herein.
- C. Control hammering and mechanical splitting of Rock and Boulders to prevent shifting of rock against/under the structures, adjacent buried utilities, new precast structures and piping.
- D. Restrictions on noise from hammering and mechanical rock removal are as follows:

Allowable hours of work: 7:00 a.m. to 6:00 p.m. (Monday - Friday)

Mechanical rock removal will not be permitted on Weekends/Holidays without prior approval by Owner.

- E. Restrictions on vibrations from mechanical rock removal as measured at the adjacent manhole structures and buried utilities are as follows:

| <u>Frequency</u> | <u>Limit (inches/second)</u> |
|------------------|------------------------------|
| <30 Hz | 0.5 |
| 30-60 Hz | 0.7 |
| >60 Hz | 1.0 |

PART 2 - EXECUTION

2.1 GENERAL

- A. Drilling operations for mechanically splitting Rock and Boulders shall be conducted Monday through Friday; 7:00 A.M. to 6:00 P.M. No explosive detonations are allowed at any time on the project.
- B. When vibrations and noise from hammering or drilling for mechanical splitting Rock and Boulders exceeds specified limits, take appropriate measures as necessary to satisfy noise requirements.

2.2 SUBGRADE PREPARATION

- A. Limit over-excavation of Rock and Boulders below design bottom of subgrade elevations to not more than three (3) feet. Remove all split and fragmented pieces of Rock or Boulders below utilities to expose rock subgrades before backfilling to design bottom of

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

structure elevation. The Engineer will advise whether fragmented rock has been adequately removed to allow backfilling.

- B. Backfill to design bottom of structure elevations in areas where rock has been removed shall consist of Structural Backfill, Crushed Stone, or 2,000 pounds per square inch (28 day) compressive strength concrete.
- C. Rock subgrade surfaces having an average slope greater than 10 percent across the width of the trench or bottom of proposed structure in any direction shall be corrected (i.e., leveled) at no cost to the Owner. Leveling shall be accomplished by additional rock removal or backfilling to the maximum required slope with lean concrete having a 28-day compressive strength of 2,000 psi.

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 312500

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Control measures to prevent all erosion, siltation, and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas.
 2. Control measures shall be accomplished adjacent to or in the following work areas:
 3. Soil stockpiles and on-site storage and staging areas.
 4. Cut and fill slopes and other stripped and graded areas.
 5. Constructed and existing swales and ditches.
 6. At edge of wetlands areas, if applicable, as shown on Drawings.
 7. The Contract Drawings indicate the minimum requirements for sedimentation and erosion control.
 - a. The Contractor shall install all measures needed to control sediment and erosion as required by the Contractor and Sub-contractor's construction methods and operations, the weather conditions, and as directed by the Engineer.
 - b. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the Owner.
 8. Periodic maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished.
 - a. Sediment control measures shall be in working condition at the end of each day.
 - b. After any significant rainfall, sediment control structures shall be inspected for integrity. Any damaged devices shall be corrected immediately.
 9. Alternates: Not Applicable.
 10. Items to Be Installed Only: Not Applicable.
 11. Items to Be Furnished Only: Not Applicable.
 12. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - a. Section 312000 – EARTH MOVING for soil materials, excavating, backfilling, and site grading and removal of site utilities.

1.3 SUBMITTALS

- A. Refer to SECTION 013300 – SUBMITTALS for submittal provisions and procedures.
- B. STORMWATER POLLUTION PREVENTION PLAN (SWPPP): At least 20 days prior to the start of the project, the Contractor shall submit an Appendix by a qualified person to the Draft SWPPP indicating project phasing, Contractor operation areas, work areas, stockpile locations, construction staging/sequencing, and sedimentation and erosion control measures to be used. This Appendix shall become part of the SWPPP that is to be updated and maintained by the Contractor.
- C. As part of the Contract Closeout procedures, the Contractor is responsible for filing a Notice of Termination with the EPA once the project has been completed and is permanently stabilized. Stabilization is complete when all temporary storm water and erosion controls have been removed, all permanent storm water and erosion controls are in place and functional and all vegetated areas are at least 70% viable.
- D. The Contractor shall provide the manufacturer's literature, material specification, and installation instructions for sedimentation and erosion control materials and devices for approval. Do not order materials until approval of certifications or test results has been obtained. Delivered materials shall match the approved submittals.

1.4 QUALITY ASSURANCE

- A. Prevention Plan prepared for the NPDES permit, which are incorporated herein by reference, and all other applicable requirements of governing authorities having jurisdiction. The specifications and drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the project site and adjacent property.
 - 1. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a sediment and erosion control plan specific to the site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.
- C. The Contractor shall install and maintain sedimentation control devices during construction to prevent the movement of sediment from the construction site to off site areas, into adjacent water bodies via surface runoff or into underground drainage systems. Measures to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at no additional cost to the Owner.
- D. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.
- F. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.
- G. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.
- H. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half.
- I. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- J. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

1.5 REFERENCE STANDARDS

- A. "Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials", prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, dated March 1997, reprinted May 2003.

1.6 EXAMINATION OF SITE AND DOCUMENTS

- A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation of the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period and formed his own conclusions as to the full requirements of the work involved.

1.7 PERMITS, CODES, AND REGULATIONS

- A. Comply with all rules, regulations, laws, and ordinances of the City and State, and all other authorities having jurisdiction over the project site. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided by the Contractor without additional cost to the Owner.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1.8 Comply with all applicable regulations of the Commonwealth of Massachusetts Department of Environmental Protection (DEP) and the EPA.

1.9 The Contractor shall comply with the requirements of the NPDES CGP for this project.

1.10 STORM WATER POLLUTION PREVENTION PLAN

- A. A professional engineer has prepared a Draft Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall locate the SWPPP and review its contents thoroughly. Upon the award of the Contract, the Contractor becomes responsible for implementing the SWPPP and meeting the requirements and standards detailed within the SWPPP. The Contractor is also responsible for all record keeping associated with maintaining the SWPPP and for maintaining in good operating condition all SWPPP controls. The Contractor shall modify the SWPPP as necessary to reflect changes in project scope, schedule, or approach. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided by the Contractor without additional cost to the Owner.
- B. The Contractor shall fill out all pertinent information within the SWPPP.
- C. The Contractor shall locate the EPA "Notice of Intent for Storm Water Discharges Associated with CONSTRUCTION ACTIVITY Under a NPDES General Permit" (NOI) form in the SWPPP. The Contractor is responsible for signing and filing his copy of the NOI at least 14 calendar days prior to the start of any construction activity and placing a signed copy along with proof of mailing in the SWPPP.
- D. The Contractor is responsible for obtaining a copy of the Owner's filed copy of the NOI form and proof of mailing and placing it in the SWPPP.
- E. The Contractor is responsible for filling in the Contractor and Sub-Contractor information in the areas indicated within the SWPPP and for completing the Contractor's Certification portion of the SWPPP.
- F. The Contractor is responsible for maintaining the following records on site:
 1. Completed SWPPP as indicated in sections B, C, D, and E.
 2. Completed Inspection Reports
 3. Completed Maintenance Reports
 4. Construction Activity Reports
 5. Spill Records
 6. Materials relevant to the NOI Permit and SWPPP
 7. A copy of the Notice of Termination
- G. The Contractor is responsible for filing a Notice of Termination once the project has been completed and is permanently stabilized. Stabilization is complete when all temporary storm water and erosion controls have been removed, all permanent storm water and erosion controls are in place and functional and all vegetated areas are at least 70% viable.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- H. All labor, materials, equipment, and services necessary to make the work comply with the above requirements shall be provided by the Contractor without additional cost to the Owner.

PART 2 - PRODUCTS AND MATERIALS

2.1 MATERIALS

A. STRAW BALES:

1. Wire or nylon bound bales of straw, oriented around sides, rather than over and under.
2. STAKES:
 - a. Stakes for bales shall be one of the following materials:
 - 1) Wood stakes of sound hardwood 2 by 2 inches in size
 - 2) Steel reinforcing bars of at least No. 4 size.
 - b. Lengths shall be approximately three feet.

B. STRAW WATTLES

1. Straw wattles shall consist of weed free rice straw inside biodegradable netting.
2. Straw wattles shall measure at least nine (9) inches in diameter.
3. STAKES:
 - a. Stakes for wattles shall be one of the following materials:
 - 1) Wood stakes of sound hardwood, 1 in. by 1 in. (1" x 1") in size.
 - 2) Steel reinforcing bars of at least No. 4 size.
 - b. Lengths shall be approximately two feet (2').

C. SILT FENCE

1. Woven or non-woven geotextile fabric meeting the following properties measured as per the referenced test methods:

| PROPERTY | | MAXIMUM | TEST METHOD |
|---------------------------|------------------------|------------------------|-------------|
| Grab Tensile Strength | 123 lbs. | N/A | ASTM D 4632 |
| Elongation @ Failure | 15% | 60% | ASTM D 4632 |
| Trapezoidal Tear Strength | 65 lbs. | N/A | ASTM D 4533 |
| CBR Puncture Strength | 370 lbs. | N/A | ASTM D 6241 |
| *Mullen Burst Strength | 300 psi | N/A | ASTM D 3786 |
| *Puncture Strength | 65 lbs. | N/A | ASTM D 4833 |
| Permittivity | 0.05 sec ⁻¹ | 0.15 sec ⁻¹ | ASTM D 4491 |
| Water Flow Rate | 8 gal./min./SF | 12 gal./min./SF | ASTM D 4491 |
| Apparent Opening Size | US #70 Sieve | US #30 Sieve | ASTM D 4751 |
| U.V. Radiation Stability | 70% | N/A | ASTM D 4355 |

2. Use only commercially available fabric that is certified in writing by the manufacturer for the purpose intended.
3. STAKES and POSTS:
 - a. Stakes or posts for silt fence shall be one of the following materials:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- 1) Wood stakes of sound hardwood, 1 $\frac{1}{4}$ inch by 1 $\frac{1}{4}$ inch minimum size.
- 2) Metal posts of 1 inch minimum diameter.
- b. Stakes or Posts shall be a minimum of 5 ft long.
- c. Stakes or posts shall be spaced at a maximum distance of 8 ft. on center.
4. Provide suitable heavy nylon cord for securing abutting silt fence posts.

D. SNOW FENCING

1. Fencing shall be new four-foot height wood lath snow fencing.
2. Provide suitable steel staples or heavy nylon cord for securing filter cloth to support system.
3. Steel posts shall be standard 6-foot long metal stamped drive stakes commonly used to support snow fences.

E. CRUSHED STONE

1. Crushed stone shall consist of durable crushed rock or durable crushed gravel stone, free from ice and snow, sand, clay, loam, or other deleterious or organic material.
2. The crushed stone shall be uniformly blended and shall conform to the following requirements.

| Percent Passing by Weight | | |
|----------------------------------|-------------------------|-----------------------|
| Sieve Size | 1 1/2-inch Stone | 3/4-inch Stone |
| 2-inch | 100 | --- |
| 1 1/2-inch | 95-100 | --- |
| 1 1/4-inch | --- | --- |
| 1-inch | 35-70 | 100 |
| 3/4-inch | 0-25 | 90-100 |
| 1/2-inch | --- | 10-50 |
| 3/8-inch | --- | 0-20 |
| No. 4 | --- | 0-5 |

F. PROTECTIVE MEASURES:

1. As temporary coverings on ground areas subject to erosion, provide one of the following protective measures, and as directed by the Designer with concurrence of the Owner's Representative:
 - a. Hay or straw temporary mulch, 100 pounds per 1,000 square feet.
 - b. Wood fiber cellulose temporary mulch, 35 pounds per 1,000 square feet.
 - c. Tackifier for anchoring mulch or straw shall be a non-petroleum based liquid bonding agent specifically made for anchoring hay or straw.
 - d. Provide natural (jute, wood excelsior) or man-made (glass fiber) covering with suitable staples or anchors to secure to ground surface. Note that wire staples and non-biodegradable coverings shall not be used for any area that will be mown turf.
 - e. Temporary vegetative cover for graded areas shall be undamaged, air dry threshed straw or hay free of undesirable weed seed.

G. TEMPORARY COVERS FOR DRAINAGE STRUCTURES

1. Filter fabric for use as temporary covers for drainage structures shall be the same as noted above for siltation fence.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2. Wire mesh for use at temporary drainage structure covers shall be 6" x 6", W2.9 welded wire mesh.
3. Crushed stone shall be as specified herein before.
4. Silt-Sac, Hydro-FloGard + Plus Catch Basin Insert, Ultra-DrainGuard Insert, or approved equal, may be used in lieu of hay bales and filter fabric at catch basins.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The Contractor shall provide suitable and adequate means of sedimentation and erosion control during construction. Control measures shall prevent all erosion, siltation, and sedimentation of waterways, drainage systems, construction areas, adjacent areas and off-site areas. Work shall be accomplished on and/or adjacent to the following work areas:
 1. Earthwork stockpiles and on-site storage and staging areas.
 2. Cut and fill slopes and other stripped and exposed graded areas.
 3. Constructed and existing swales and ditches.
 4. Unestablished lawns and seeded embankments.
- B. Means of protection as noted on the Contract Drawings indicate the minimum provisions necessary. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional expense to the Owner.
- C. Periodic maintenance of all sediment control installations shall be provided to ensure intended purposes are accomplished. Sediment control measures shall be in working condition at the end of each day.
- D. After any significant rainfall, sediment control devices shall be inspected for integrity. Any damaged device shall be corrected immediately.
- E. The Contractor shall provide adequate means of control of runoff, as to not detrimentally impact downstream conditions during construction. The Contractor shall plan his operations so that permanent drainage mitigation systems such as detention/retention/infiltration basins and chambers are in place and properly functioning prior to connecting upland drainage flows to these systems. The Contractor shall plan his operations such that downstream drainage mitigation measures are in place and functioning before attempting to tie in upgradient drainage systems.
- F. In the event that the Contractor is unable to sequence the work so that construction of the permanent drainage mitigation systems precedes the upland work, then the Contractor shall submit a plan indicating his proposed methods of otherwise controlling runoff from the site.
- G. The "Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas" should be consulted as a guide for the selection and installation of Best Management Practices to suit the conditions encountered.

3.2 STRAW BALE BARRIERS

- A. Excavation shall be to the width of the bale and the length of the proposed barrier to a minimum depth of 4 inches.
- B. Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches, the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale.
- C. Staking shall be accomplished to securely anchor bales by driving at least two stakes or rebars through each bale to a minimum depth of 18 inches.
- D. The gaps between bales shall be filled by wedging straw in the gaps to prevent water from escaping between the bales.
- E. The excavated soil shall be backfilled against the barrier. Backfill shall conform to ground level on the downhill side and shall be built up to 4 inches on the uphill side. Loose straw shall then be scattered over the area immediately uphill from a straw barrier.
- F. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
- G. Bales shall be removed when they have served their usefulness so as not to block or impede stormwater flows or drainage.

3.3 STRAW WATTLE BARRIERS

- A. Install straw wattles in locations as shown on Contract Drawings and as directed.
 - 1. Wattles shall be placed in a row with ends overlapping a minimum of two (2) feet.
 - 2. Each wattle shall be embedded in the soil a minimum of two (2) and a maximum of six (6) inches.
 - 3. Wattles shall be securely anchored in place by stakes or rebars driven through the wattles and a minimum twelve (12) inches into the soil. Stakes shall be placed four (4) feet on center.
- B. Inspection shall be frequent and repair or replacement shall be made as needed.
- C. Wattles shall be removed when they have served their usefulness so as not to block or impede stormwater flows or drainage.

3.4 STABILIZED CONSTRUCTION ENTRANCE AND STONE BERMS

- A. Stone size: Use ASTM designation C-33, size No. 2 (1-1/2" to 2-1/2"). Use crushed stone.
- B. Length: As effective, but not less than 50 feet.
- C. Thickness: Not less than eight inches.
- D. Width: Not less than full width of all points of ingress or egress, but not less than 25 feet.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through the use of sand bags, gravel boards or other approved methods.
- F. Maintenance: The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spoiled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
- G. Place crushed stone berms in locations required and as directed. Berms shall have side slopes of 1:3 or less.
- H. Inspect stone berms periodically and replace and/or regrade crushed stone as required.

3.5 SILT FENCING

- A. Excavate a 6-inch trench along the upstream side of the desired fence location.
- B. Drive fence posts a minimum of 1'-6" into the ground. Install fence, well-staked at maximum eight-foot intervals in locations as shown on Drawings. Secure fabric to fence and bury fabric end within the six-inch deep trench cut.
- C. Lay lower 12 inches of silt fence into the trench, 6 inches deep and 6 inches wide. Backfill trench and compact.
- D. Overlap joints in fabric at post to prevent leakage of silt at seam.
- E. Inspect siltation fence after major storm events and periodically and remove accumulated sediment and debris. If a breach or failure of the siltation fence occurs, the fence shall immediately be restored.

3.6 EROSION CONTROL GRASSING

- A. Grassing shall be applied according to the Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials.

3.7 INLET PROTECTION

- A. Install silt fence or straw bales around inlet as specified herein.
- B. Install temporary covers at drainage structure locations that may be subject to erosion infiltration and as directed by the Engineer.

- C. Inspect drainage structures periodically. Remove sediment accumulation and regrade or replace materials as required.

3.8 DUST CONTROL

- A. Throughout the construction period the Contractor shall carry on an active program for the control of fugitive dust within all site construction zones, or areas disturbed as a result of construction. Control methods shall include the following: Apply calcium chloride at a uniform rate of one and one-half (1 ½) pounds per square yard in areas subject to blowing. For emergency control of dust apply water to affected areas. The source of supply and the method of application for water are the responsibility of the contractor.
- B. The frequency and methods of application for fugitive dust control shall be as directed by the Designer with concurrence by the Owner's Representative.

3.9 TEMPORARY PROTECTIVE COVERINGS

- A. Place temporary soil coverings to control erosion and sedimentation on all disturbed or graded areas as required by the construction methods employed and as directed by the Engineer. Erosion control matting shall be installed in all areas seeded or hydroseeded with slopes of one vertical foot to three-foot horizontal, or steeper, immediately after such areas have been seeded and a hay mulch applied as follows:
1. The area to receive matting shall have been recently seeded and shall have a smooth surface free from stones, clods or depressions.
 2. Roll out of the matting perpendicular to the slope, do not stretch the fabric. In drainage swales, center the fabric along the flow line. Install the matting in a check slot at the top and bottom of the slope and at the edges of the area to be covered. Check slots shall be six inches deep and six inches wide. Fabric shall extend down one wall of the check slot and across the full width of the base. Overlap edges of matting rolls four (4) inches minimum and overlap the ends eighteen (18) inches minimum.
 3. Install staples in check slots, edges, center, and ends of rolls by driving specified steel staples two feet on center over the entire area to be covered except at check slots and ends of rolls, where staples shall be placed six inches on center. All staples shall be driven below finished grade.
 4. Fill check slots with loam and tamp firmly.
 5. Reseed check slots and all disturbed areas per Specifications.
 6. Following matting installation, roll the entire area with a smooth drum roller weighing between fifty and seventy-five (50-75) pounds per linear foot of roller. The finished installation of matting shall be firmly in contact with the seeded area and provide a smooth, finished appearance free from lumps or depressions.
- B. Install erosion control matting as a temporary ground cover in all disturbed or graded areas subject to erosion and as directed by the Engineer. The temporary ground cover shall protect the site from erosion until a full permanent lawn can be installed. Install and anchor in place temporary erosion control matting in accordance with manufacturer's printed instructions or as directed by the Engineer and remove all temporary erosion control matting prior to installation of a permanent lawn.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. Inspect protective coverings periodically and reset or replace materials as required.
- 3.10 TEMPORARY PROTECTIVE COVERINGS (AFTER GROWING SEASON)
- A. Place temporary covering for erosion and sedimentation control on all areas that have been graded and left exposed after October 30. Contractor shall have the choice to use either or both of the methods described herein.
 - B. Hay or straw shall be anchored in-place by one of the following methods and as approved by the Designer with concurrence by the Owner's Representative: Mechanical "crimping" with a tractor drawn device specifically devised to cut mulch into top two inches of soil surface or application of non-petroleum based liquid tackifier, applied at a rate and in accordance with manufacturer's instructions for specific mulch material utilized.
 - C. Placement of mesh or blanket matting and anchoring in place shall be in accordance with manufacturer's printed instructions.
 - D. Inspect protective coverings periodically and reset or replace materials as required.
- 3.11 REMOVAL AND FINAL CLEANUP
- A. Once the site has been fully stabilized against erosion, and with the approval of the Owner's Representative remove sediment control devices and all accumulated silt. Dispose of silt and waste materials offsite. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated.

END OF SECTION

**SECTION 313100
NOISE AND DUST CONTROL**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This work shall consist of continuous sweeping of roads to remove dust/dirt, furnishing water or calcium chloride and applying it for the purpose of allaying dust conditions. There will be no separate payment for dust control. This will not be paid for directly but will be considered incidental to the other work in the Contract.

1.3 METHOD OF MEASUREMENT

- A. There will be no measurement for Noise and Dust Control.

1.4 BASIS OF PAYMENT

- A. There will be no separate payment for Noise Dust Control. This work will not be paid for directly but will be considered incidental to the other items of work in the contract.

1.5 WATER FOR DUST CONTROL

- A. Water used shall be clean and shall be obtained from sources approved by the Owner and Engineer.

1.6 CALCIUM CHLORIDE FOR DUST CONTROL

- A. Calcium chloride pellet form or flake form shall be equally acceptable.

1. The name of manufacturer, name of the product, net weight, and percentage of calcium chloride guaranteed by the manufacturer shall be legibly marked on each contained, except in the case of bulk shipments where the shipping notice will be acceptable as evidence of compliance with these requirements.
2. Calcium chloride may be delivered in moisture proof bags containing not more than 100 pounds each or in air-tight drums weighing not more than 450 pounds each, or it may be delivered in bulk, and shall comply with ASTM Designation D98.

1.7 NOISE ORDINANCE ENFORCED

- A. The CONTRACTOR shall observe the standard work hours for the project which are from 7am to 6pm, Monday through Friday. Exceptions to these hours may be made by written request of the CONTRACTOR to the OWNER and ENGINEER and may only be approved by the OWNER, in writing.
- B. To the extent possible the CONTRACTOR shall avoid excessive noise during the prosecution of the work to minimize disturbance to adjacent residences.
- C. Noise complaints made to the CONTRACTOR shall be reported immediately to the OWNER and ENGINEER. The OWNER shall be responsible for communicating with residents to resolve complaints.

1.8 CONSTRUCTION REQUIREMENTS FOR DUST CONTROL

A. Water

- 1. Clean water shall be applied at the location, at such times, and in the amount as may be required.
- 2. Equipment shall consist of tanks, tank trucks, distributors, pumps, hose or other devices, approved by the Engineer, which are capable of applying a uniform spread of water over the surface. Suitable shut-off and flow regulations shall be provided.

B. Calcium Chloride

- 1. Calcium chloride shall be applied at the locations, at such times, and in the amount as may be required to maintain dust-free conditions. It shall be spread such that uniform distribution is attained over the entire area on which it is placed.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not Used)

- END OF SECTION -

SECTION 321123

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Submittals and certifications.
2. Gradation.
3. Winter conditions.
4. Placing.
5. Compaction.
6. Inspection and tests.

- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 SUBMITTALS AND CERTIFICATIONS

- A. The Contractor shall submit to the Engineer sworn material certificates from the suppliers of aggregate base. The certificates shall indicate that the materials provided are in every way in conformance with the requirements of these Specifications.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The materials shall consist of hard durable particles or fragments of stone or gravel. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used for aggregate base course materials. Fine particles shall consist of natural or processed sand. The materials shall be free of injurious amounts of organic material and unless otherwise specified, the percent wear of base course materials shall not exceed 40 percent as determined by AASHTO T 96, Grading A.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. Crushed stone and crushed ledge rock shall be processed material obtained from a source which has been stripped of all overburden. The processed material shall consist of clean durable fragments of ledge rock of uniform quality reasonably free of thin or elongated pieces.

2.2 GRADATION

- A. The required gradation of Dense-Graded Crushed Stone for Sub-base shall conform to MassDOT Standard Specifications M2.01.7.
- B. The required gradation of Sand material shall conform to Table 1. The maximum size of any stone or fragment shall not exceed $\frac{3}{4}$ of the compacted depth of the layer being placed but in no case larger than 6 inches.
- C. The required gradation of Gravel material shall conform to Table 1. The maximum size of stone particles shall not exceed $\frac{3}{4}$ of the compacted thickness of the layer being placed but in no case larger than 6 inches.
- D. The required gradation of Crushed Gravel material shall conform to Table 1. At least 50 percent of the material retained on the 1-inch sieve shall have a fractured face.
- E. The required gradation of Modified Crushed Gravel material shall conform to Table 1. At least 50 percent of the material retained on the #4 sieve shall have a fractured face.
- F. The required gradation of Crushed Gravel material for shoulders and shoulder leveling shall conform to Table 1:

Project Number 21.926301.00
 Pedestrian Safety & Traffic Circulation Improvements Project
 Dracut Public Schools
 Town of Dracut, Massachusetts

| TABLE 1 BASE COURSE MATERIALS | | | | | | | |
|----------------------------------|--------|---------------------|---------------|---------------------------|--------------------------------------|------------------------|-----------------------|
| SIEVE SIZE | | REQUIRED GRADUATION | | %PASSING BY WEIGHT | | | |
| ITEM | SAND | GRAVEL | CR. GRAVEL | MODIFIED CR. GRAVEL | CR. AGGREGATE FOR SHOULDERS | CR. STONE (FINE) | CR. STONE (COARSE) |
| 6" | 100 | 100 | --- | --- | --- | --- | --- |
| 5" | --- | --- | --- | --- | --- | --- | --- |
| 4" | --- | --- | --- | --- | --- | --- | --- |
| 3½" | --- | --- | --- | --- | --- | --- | 100 |
| 3" | --- | --- | 100 | 100 | --- | --- | 85-100 |
| 2" | --- | --- | 95-100 | 95-100 | --- | 100 | --- |
| 1½" | --- | --- | --- | --- | 100 | 85-100 | 60-90 |
| 1" | --- | --- | 55-85 | --- | 90-100 | --- | --- |
| ¾" | --- | --- | --- | --- | --- | 45-75 | 40-70 |
| #4 | 70-100 | 25-70 | 27-52 | 27-55 | 30-65 | 20-45 | 15-40 |
| #200 (In Sand Portion)* | 0-12 | 0-12 | 0-12 | 0-12 | --- | --- | --- |
| #200 (In Total Sample) | --- | --- | --- | --- | 0-10 | 0-5 | 0-5 |

* FRACTION PASSING THE NO. 4 SIEVE

- G. The required gradation of Crushed Gravel material for unpaved drives shall meet the gradation requirements of either crushed gravel or crushed stone (fine) as shown in Table 1. This item shall be used for the surface course of drives which are not designated to be paved.
- H. The required gradation of Crushed Stone Base Course (Fine Gradation) shall conform to Table 1. Acceptable sand may be blended as necessary to obtain the proper gradation for the fine aggregate portion.
- I. The required gradation of Crushed Stone Base Course (Course Gradation) shall conform to Table 1. Acceptable sand may be blended as necessary to obtain the proper gradation for the fine aggregate portion.
 - 1. The substitution of crushed stone meeting the gradation requirements of crushed stone base course (fine gradation) for all or part of this item will not be permitted.

PART 3 - EXECUTION

3.1 GENERAL

- A. Upon approval, base course materials found within the project limits may be used under the specific item provided they meet the gradation requirements set forth in Table 1.
- B. Permission may be given to substitute gravel or a mixture of sand and gravel for any sand course when sand is designed as part of the base. The substitution must be made across the entire section and will not be allowed for short or discontinuous segments.
- C. Permission may be given to substitute crushed gravel for gravel or crushed stone (fine gradation) for crushed gravel. The substitution must be made across the entire section and will not be allowed for short or discontinuous segments.
- D. Crushed aggregate base course materials shall be produced and placed in their final location with as little segregation as possible.

3.2 WINTER CONDITIONS

- A. Under no circumstances shall base course materials be placed on or above frozen materials.
- B. If the density requirements are not attained for any layer before the material freezes, no further material shall be placed on that layer.

3.3 PLACING

- A. The base course material shall be spread in the amount necessary for proper consolidation and shall be shaped true to grade and cross section by means of power graders or other approved equipment.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- B. The subgrade or preceding course shall be shaped to the specified crown and grade and maintained in a smooth condition free of holes and ruts. If the hauling equipment should cause ruts in the subgrade or previously placed base course, the equipment shall be operated only on the course being placed, behind the spreading equipment.
- C. Crushed gravel for shoulder leveling shall be spread uniformly along the area adjoining the edge of the pavement. The materials shall be spread along both sides of guardrail where there is no curb.
- D. Care shall be taken to avoid segregation during placement. When base course material is dumped in piles, it shall be dumped on the course being placed and spread at once onto the previously placed layer. If spreading equipment is not available, dumping will not be permitted. Any segregation which occurs shall be remedied or the materials removed and replaced at no additional cost to the Owner.
- E. Crushed aggregate shall be hauled from an approved stockpile. Material obtained directly from a conveyor will not be placed on the roadway without first stockpiling.
- F. The Contractor's method of operation shall be such that oversized stones will not be delivered to the project.
- G. To prevent segregation of crushed aggregate during spreading and to assist in obtaining the required density of the mixture, water may be added to the crushed aggregate prior to performing the grading operations. The course shall be maintained in the moist condition during grading operations.
- H. Prior to fine grading, hard spots in the surface of the top layer shall be eliminated by scarifying the top 4 inches.
- I. When the base course is to be surface-treated and no pavement is to be placed upon it, stones having any dimension greater than 3 inches shall be removed from the upper 4 inches of the top layer.
- J. Surface voids in crushed stone base course (fine gradation) shall be eliminated by the addition of filler material to just fill the voids. Any surplus filler material shall be removed. The finished surface shall be uniform, true to grade, and free from segregation. The Contractor shall furnish and place filler material to correct any visible segregation prior to paving. The filler material shall be spread, scarified if required, into the course and recompacted to the required density. Filler material shall meet the gradation requirements of sand. The final gradation of crushed stone base course (fine gradation) shall meet the requirements of Table 1.

3.4 COMPACTION

- A. Unless shown on the plans or ordered otherwise, the compacted depth of sand courses shall not exceed 12 inches. The compacted depth of any layer of gravel, crushed gravel, or crushed stone placed shall not exceed 8 inches. The compacted depth of any layer of crushed ledge rock shall not exceed 24 inches.

- B. Compaction of base course material shall be done with approved vibratory rollers and adequate water to meet the requirements of paragraph 8. A roller producing a dynamic force of at least 27,000 pounds shall be used for layers up to 12 inches. For layers between 12 inches and 24 inches, the roller shall produce a dynamic force of at least 42,000 pounds. Rolling and shaping shall continue until the required density is attained.
- C. Rolling and shaping patterns shall begin on the lower side and progress to the higher side of the course while lapping the roller passes parallel to the centerline. Rolling and shaping shall continue until each layer conforms to the required grade and cross section and the surface is smooth and uniform.
- D. Water shall be uniformly applied over the base course materials during compaction in the amount necessary for proper consolidation.
- E. When vibratory equipment is being operated, the amplitude of vibrations will be adjusted as necessary to avoid causing damage to adjacent buildings and property.
- F. Except at inaccessible locations, such as guard rail, material used for shoulder leveling shall be set with a pneumatic-tired roller.
- G. The density of all Aggregate Base Course materials shall not be less than 95 percent of the maximum density as determined by AASHTO T 180 (Modified Proctor Density) or 95 percent of an accepted control strip. See paragraph 8.5.1.

3.5 INSPECTION AND TESTS

- A. Tests Prior to Material Installation
 - 1. At least one (1) test shall be made on a representative sample of each of the materials that will be used on this project. These tests shall be made by an independent testing laboratory, acceptable to the Engineer and paid by the Contractor. A copy of all test results shall be delivered to the Engineer prior to that material's incorporation into the work.
- B. Tests after Material Installation
 - 1. The Owner reserved the right to have field gradation and compaction tests performed by an independent laboratory with all testing costs borne by the Owner subject to the provisions in Section 014000, Quality Requirements. Field density tests will be made to determine the actual in-place densities being attained.
- C. Testing for Gradation
 - 1. Sampling procedure shall conform to AASHTO T 2. Testing procedure shall be in accordance with AASHTO T 27. Materials not meeting the gradation requirements shall not be used.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

2. The amount of material finer than the #200 sieve shall be determined according to AASHTO T 11 which specifies dry sieving after washing. Samples for acceptance testing of the material in place will be taken as the spreading operations progress on each lift just prior to the beginning of the compaction operations on that lift. For a preliminary determination of compliance with the specification for gradation, samples of sand and gravel may be taken from the pit and samples of crushed aggregate may be taken from the stockpile or from the final phase of the crushing operation.
3. Previously tested and accepted material contaminated by earthen, organic, or other foreign matter, or degraded by hauling equipment, to such an extent that the material no longer meets the gradation requirements, shall be removed and replaced at the Contractor's expense.

D. Density Testing

1. The density of sand courses shall be determined by AASHTO T 191 (Sand Cone Method), AASHTO T 204 (Drive Cylinder Method), or AASHTO T 238 (Nuclear Methods).
2. The density of gravel and crushed gravel courses shall be determined by AASHTO T 191 (Sand Cone Method), or AASHTO T 238 (Nuclear Methods). The density of crushed stone base courses will be determined by the Nuclear Method.

E. Control Strip Procedure

1. At the beginning of the compaction operation a control strip of at least 100 lineal feet in length and spanning the width of the section being placed may be constructed. The density requirement shall be determined by compacting the control strip at a suitable moisture content until no further increase in density can be measured. The remainder of the course shall be compacted to a density not less than 95 percent of the maximum control strip density, as measured by the nuclear density testing equipment. A new control strip will be required when there is a significant change in the gradation of the material being placed, or a change in compaction equipment. Compaction of the control strip shall be done with approved vibratory rollers or compactors capable of producing a dynamic force of at least 27,000 pounds.

END OF SECTION

SECTION 321216

ASPHALT PAVING

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Commonwealth of Massachusetts Highway Department (MHD) "Standard Specifications for Highways and Bridges, 1988" and supplements.
- C. Attention is directed to the AGREEMENT AND GENERAL CONDITIONS and Exhibits and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made a part of this section of the specifications.

1.2. SUMMARY

A. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Pavement-marking paint (exterior).

1.3. DEFINITION

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4. ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: For each job mix proposed for the Work.

1.5. INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified manufacturer and Installer.

B. Material Certificates: For each paving material, from manufacturer.

1.6. QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of all governing authorities for asphalt paving work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.
- D. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - b. Review condition of subgrade and preparatory work.
 - c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.7. DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.8. PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Prime Coat: Minimum surface temperature of 60 deg F.
 - 2. Tack Coat: Minimum surface temperature of 60 deg F.
 - 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
 - 4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 - 5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and in accordance with the manufacturer's requirements.
 - 1. Pavement marking materials shall meet Federal, State and Local environmental standards.
 - 2. Paint shall be manufactured and formulated from first grade raw materials and shall be free from defects or imperfections that might adversely affect product serviceability.

3. Paints shall comply with the National Organic Compound Emission Standards for Architectural Coatings, Environmental Protection Agency, 40 CFR Part 59.
4. The product shall not contain mercury, lead, hexavalent chromium, or halogenated solvents.

PART 2 – PRODUCTS

2.1. AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2. ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO MP 1a, performance grade as required by state DOT specifications where the project is located.
- B. Refer to state or local DOT for details of asphalt emulsion prime coat; there are no ASTM or AASHTO product standards.
- C. Prime Coat: Asphalt emulsion prime coat complying with state DOT specifications where project is located.
- D. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application. Verify acceptance with state DOT where the project is located.
- E. Water: Potable.

2.3. AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.
- B. Sand: ASTM D 1073, Grade Nos. 2 or 3.
- C. Joint Sealant: ASTM D 6690, Type I or Type II, hot-applied, single-component, polymer-modified bituminous sealant.
- D. Pavement-Marking Paint (Exterior):

1. Material used and method of installation shall conform with the relevant provisions of the MassDOT "Standard Specifications for Highways and Bridges", Subsection M7.01.03, M7.01.04 and Section 860.
2. MassDOT "Standard Specifications for Highways and Bridges", Subsection M7.01.03 White Thermoplastic Reflectorized Pavement Markings.
3. MassDOT "Standard Specifications for Highways and Bridges", Subsection M7.01.04 Yellow Thermoplastic Reflectorized Pavement Markings.
4. The Colorized Preferential Lane Markings (CPLM) shall be composed of a two (2) component, epoxy-modified, acrylic, waterborne coating specially formulated to have a balance of properties that will ensure adhesion and movement on a flexible pavement, while providing excellent durability and color stability. Key properties shall include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties.

Typical Physical Properties of the CPLM

| Characteristic | Test Specification | Coating |
|-------------------------|--------------------|-----------------------------------|
| Solids by volume | ASTM D 2697 | 55% |
| Solids by weight | ASTM D 2369 | 68.90% |
| Density | ASTM D 1475 | 13.34 lbs/gal (1.599 kg/l) |

CPLM shall be environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

CPLM shall be Ride-A-Way by Ennis-Flint products, (www.ennisflint.com); Safe-T-Grip by Copeland Coating Company, (www.copelandcoating.com); HFS by Sealcoat USA, (www.sealcoatusa.com); or equal products.

E. Pavement-Marking Paint:

1. Epoxy paint may be used for all markings, unless noted otherwise on the Drawings. Paint shall be a two-component system consisting of minimum 99 percent solids. The material shall be specifically formulated as a pavement marking material and shall be spray applied at ambient temperatures.
 - a. The specific paint formulation shall be approved for use on highways by the state and/or local DOT where the project is located.
2. 100% acrylic waterborne - paint shall be used for white and yellow pavement markings and shall meet requirements of MPI #70.
 - a. All products shall have performance requirements of Type I and II of Federal Standard TT-P-1952E.
 - b. 100% acrylic waterborne paint for special color pavement markings (blue, green, red, black) shall meet requirements of Federal Specification TT-P-1952E. Special color marking materials shall be compatible with the white and yellow pavement markings where they are layered.

2.4. MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 2. Surface Binder Course: MHD, M3.11.03 Binder Course(Superpave 19mm)
 3. Surface Wearing Course: MHD, M3.11.03 Top Course(Superpave 12.5 mm).
- B. Emulsified-Asphalt Slurry: ASTM D 3910.

PART 3 – EXECUTION

3.1. EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2. COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 1. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 2. Control rate of milling to prevent tearing of existing asphalt course.
 3. Repair or replace curbs, manholes, and other construction damaged during cold milling.
 4. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
 5. Transport milled hot-mix asphalt to asphalt recycling facility.
 6. Keep milled pavement surface free of loose material and dust.

3.3. PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4. REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 - 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
 - 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 - 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 - 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5. SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
 - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.

- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6. HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
1. Place hot-mix asphalt base course in number of lifts and thicknesses as specified by the state DOT where the project is located.
 2. Place hot-mix asphalt surface course in number of lifts and thicknesses as specified by the state DOT where the project is located.
 3. Spread mix at minimum temperature of 250 deg F.
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7. JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead"

or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8. COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density: Each course placed at a depth of 1-1/2 inches or greater shall have the mat and longitudinal joints compacted to a minimum of 92.0 percent and no more than 97.0 percent density as determined by AASHTO T209 (modified).
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9. INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 1. Surface Binder Course: Plus 1/2 inch, no minus.

2. Surface Wearing Course: Plus 1/4 inch (6 mm), no minus.
 - B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 1. Surface Binder Course: 1/4 inch.
 2. Surface Wearing Course: 1/8 inch.
 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- 3.10. PAVEMENT MARKING (EXTERIOR)
- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect and/or Engineer.
 - B. Allow paving to age for 30 days before starting pavement marking.
 - C. Sweep and clean surface to eliminate loose material and dust.
 - D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - E. Apply paint with mechanical equipment to produce markings to the dimensions as indicated on the drawings, with uniform, straight parallel edges. Striping to be perpendicular to garage structure, unless noted otherwise.
 - F. Handicap pavement markings as determined by MUTCD standards.
- 3.11. FIELD QUALITY CONTROL
- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
 - D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
 - E. In-Place Density: Field density of in-place compacted pavement shall be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
 - F. In-Place Density: Field density of in-place compacted pavement may also be determined by testing agency taking samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
- G. Replace and compact hot-mix asphalt where core tests were taken.
- H. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12. DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow milled materials to accumulate on-site.

3.13. AS-BUILT DRAWINGS

- A. The Contractor shall provide as-built drawings markups on a monthly basis. As work progresses, all construction activities shall be documented. The record documents shall include:
1. Location and extend of curbs, pavements, traffic calming devices.
 2. The Contractor shall hire the services of a surveyor licensed in the state where the work is being performed to determine parameters stated above or completed work and record the results and update the electronic files. As-builts shall include horizontal and vertical locations (elevations) at 50-foot increments.
 3. Final documents (drawings and electronic files in AutoCAD format, latest edition), shall be submitted to the designated Owner's Representative not later than 30 days after substantial completion of the project. All comments shall be incorporated to the final documents within 14 days after receiving them from the Owner's Representative. The final record set (hard copy and the electronic files) shall be submitted to the Owner's Representative.

END OF SECTION

SECTION 321613

GRANITE CURB

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Submittals.
2. Reference standards.
3. Quality assurance.
4. Delivery, storage and handling.
5. Materials.
6. Installation.
7. Connections to structures.
8. Testing.
9. Cleaning.
10. Disinfection.

- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 SUBMITTALS

- A. Material Certificates: Provide copies of the material certificates signed by the material producer and the Contractor, certifying that material items comply with specified requirements.
- B. Approval of granite curb supplier is required prior to purchasing of curb and curb inlet material.

PART 2 - PRODUCTS

2.1 GRANITE CURB AND CURB INLETS

- A. Areas of new granite curb to match detailed thickness as shown on the Drawings. Provide granite curb to complete project requirements.

2.2 CONCRETE BEDDING

- A. Compressive Strength: 3000 psi.
- B. Cement Factor: 520 pounds per cubic yard.
- C. Coarse Aggregate Size: $\frac{3}{4}$ inches.
- D. Slump: 1 to 3 inches.

PART 3 - EXECUTION

3.1 GENERAL: Install curbing to the lines, grades, and details shown of the Drawings.

3.2 SUBGRADE

- A. Ensure all utilities and other improvements have been installed prior to backfill/subgrade preparation. Prepare the subgrade by removing all soft or spongy material and backfilling with suitable material.
- B. Compact: the surface uniformly to 95% Modified AASHTO Laboratory density (ASTM D-1557, Method).
- C. Subgrade shall be approved by the Engineer before the base is installed.

3.3 BASE

- A. Place: in maximum 6" layers.
- B. Compact: each layer uniformly to 95% Modified AASHTO Laboratory density (ASTM D-1557, Method C).

3.4 CURB INSTALLATION

- A. Set curb on edge. Settle into place with a heavy wooden hand rammer.
- B. Place a minimum of 2 CF of concrete at each joint and continuously along the front face as shown on the Drawings. Ensure that top exposed edge of curb face is consistent and true to line and grade. Support curb as required until concrete cures and all backfill operations have been completed.
- C. Omit concrete and mortar grout at 50 (+,-) foot intervals to allow for expansion.
- D. Backfill with approved material, compacted to 95% Modified AASHTO Laboratory density (ASTM D-1557, Method C).

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. Point joints with mortar for the full depth and width of curbing. Conform to the details on the Drawings.

END OF SECTION

SECTION 321817

POURED-IN-PLACE RUBBER SAFETY SURFACE

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: Purchase, take delivery and install Poured-in-Place Playground Surfacing System: Extreme-10 with a 10-year warranty.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):

1. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
2. ASTM D624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
3. ASTM D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
4. ASTM D2859 Standard Test Method for Flammability of Finished Textile Floor Covering Materials.
5. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
6. ASTM F1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
7. ASTM F1951 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide a 2-layer rubber-urethane playground surfacing system which has been designed, manufactured and installed to meet the following criteria:

1. Shock Attenuation (ASTM F1292):
 - a. Gmax: Less than 200.
 - b. Head Injury Criteria: Less than 1000.
2. Flammability (ASTM D2859): Pass.
3. Tensile Strength (ASTM D412): 60 psi (413 kPa).
4. Tear Resistance (ASTM D624): 140%.
5. Water Permeability: 0.4 gal/yd²/second.
6. Accessibility: Comply with requirements of ASTM F1951

1.4 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Quality Assurance/Control Submittals: Submit the following:
 - 1. Certificate of qualifications of the playground surfacing installer.
- C. Closeout Submittals: Submit the following:
 - 1. Warranty documents specified herein.

1.5 QUALITY ASSURANCE

- A. Qualifications: Utilize an installer approved and trained by the manufacturer of the playground surfacing system, having experience with other projects of the scope and scale of the work described in this section.
- B. Certifications: Certification by manufacturer that installer is an approved applicator of the playground surfacing system.
- C. International Play Equipment Manufacturers Association (IPEMA) certified.

1.6 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at a minimum temperature of 40 degrees F (4 degrees C) and a maximum temperature of 90 degrees F (32 degrees C).

1.7 PROJECT / SITE CONDITIONS

- A. Environmental Requirements: Install surfacing system when minimum ambient temperature is 40 degrees F (1 degree C) and maximum ambient temperature is 90 degrees F (32 degrees C). Do not install in steady or heavy rain.

1.8 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- C. Proper drainage is critical to the longevity of the PlayBound Poured-in-Place surfacing system. Inadequate drainage will cause premature breakdown of the poured system in affected areas; and void the warranty.

PART 2 – PRODUCTS

2.1 Poured-in-Place Playground Surfacing System

- A. Manufacturer: Surface America, Inc.
1. Contact: : PO Box 157, Williamsville, NY 14231; Telephone: (800) 999-0555, (716) 632-8413; Fax: (716) 632-8324; E-mail: info@surfaceamerica.com; website: <http://www.surfaceamerica.com>.
- B. Proprietary Products / Systems. Poured-in-place playground surfacing system, including the following:
1. PlayBound Poured-in-Place Primer:
 - a. Material: Urethane
 2. PlayBound Poured-in-Place Basemat:
 - a. Material: Blend of 100% recycled SBR (styrene butadiene rubber) and urethane
 - b. Thickness: 1 ¼" (31.75 mm) for 4' critical fall height
 - c. Formulation Components: Blend of strand and granular material
 3. PlayBound Poured-in-Place Top Surface:
 - a. Material: Blend of recycled EPDM (ethylene propylene diene monomer) rubber or TPV Granule and aromatic or aliphatic urethane binder.
 - b. Thickness: Nominal ½" (12.7 mm), minimum 3/8" (9.5 mm), maximum 5/8" (15.9 mm)
 - c. Color: See plans
 - d. Dry Static Coefficient of Friction (ASTM D2047): 1.0.
 - e. Wet Static Coefficient of Friction (ASTM D2047): 0.9.
 - f. Dry Skid Resistance (ASTM E303): 89.
 - g. Wet Skid Resistance (ASTM E303): 57

2.2 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

2.3 MIXES

- A. Required mix proportions by weight:
1. Basemat: 16+% urethane (as ratio: 14% urethane divided by 86% rubber). 14% urethane, 86% rubber (based on entire rubber & urethane mix).
 2. Top Surface: 22% urethane (ratio: 18% urethane divided by 82% rubber). 18% urethane, 82% rubber (based on entire rubber & urethane mix).

PART 3 – EXECUTION

3.1 MAUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the playground surfacing manufacturer.

3.2 EXAMINATION

- A. Substrate preparation must be in accordance with surfacing manufacturer's specification. New asphalt must be fully cured – up to 30 days.
- B. Proper drainage is critical to the longevity of the PlayBound Poured-in-Place surfacing system. Inadequate drainage will cause premature breakdown of the poured system in affected areas; and void the warranty. Test drainage and ensure that there is no puddling deeper than $\frac{1}{4}$ " on asphalt prior to installing poured-in-place rubber surface.

3.3 PREPARATION

- A. Surface Preparation: Using a brush or short nap roller, apply primer to the substrate perimeter and any adjacent vertical barriers such as playground equipment support legs, curbs or slabs that will contact the surfacing system at the rate of 300 ft²/gal (7.5 m²/L).

3.4 INSTALLATION

- A. Do not proceed with playground surfacing installation until all applicable site work, including substrate preparation, fencing, playground equipment installation and other relevant work, has been completed.
- B. Basement Installation:
 1. Using screeds and hand trowels, install the basemat at a consistent density of 29 pounds, 1 ounce per cubic foot (466 kg/m³) to the specified thickness.
 2. Allow basemat to cure for sufficient time so that indentations are not left in the basemat from applicator foot traffic or equipment.
 3. Do not allow foot traffic or use of the basemat surface until it is sufficiently cured.
- C. Primer Application: Using a brush or short nap roller, apply primer to the basemat perimeter and any adjacent vertical barriers such as playground equipment support legs, curbs or slabs that will contact the surfacing system at the rate of 300 ft²/gal (7.5 m²/L).
- D. Top Surface Installation:
 1. Using a hand trowel, install top surface at a consistent density of 58 pounds, 9 ounces per cubic foot (938 kg/m³) to a nominal thickness of 1/2" (12.7 mm).
 2. Allow top surface to cure for a minimum of 48 hours.
 3. At the end of the minimum curing period, verify that the top surface is sufficiently dry and firm to allow foot traffic and use without damage to the surface.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

4. Do not allow foot traffic or use of the surface until it is sufficiently cured.

3.5 PROTECTION

- A. Protect the installed playground surface from damage resulting from subsequent construction activity on the site.

END OF SECTION

SECTION 329000

PLANTING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made a part of this Section.
- B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade

1.2 SUMMARY

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:
 - 1. Planting trees and shrubs.
 - 2. Planting maintenance.
 - 3. One year guarantee period for all plants.
 - 4. Providing and placing backfill mix.

1.3 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 329119 LANDSCAPING

1.4 QUALITY ASSURANCE

- A. Qualification of Landscape Contractor: The work of this Section shall be of a similar quality, schedule requirement, and construction detailing with a minimum of five (5) years' experience.

1.5 SUBMITTALS

- A. Submit in accordance with Section 013300 SUBMITTALS.
- B. Submit proof of landscape contractor's experience to the Owner's Representative in accordance with QUALITY ASSURANCE paragraph of this Section.
- C. At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material which does not meet these Specifications.

- D. Samples:
1. Sampling and Testing of Planting Soils
 1. Installation of Planting Soil
 2. Planting Mulch: Submit a one quart sample.
 3. Anti-desiccant: Submit manufacturer's product data.
 4. Compost
 5. Mycorrhizal Fungal Inoculant: Submit manufacturer's product data

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.

1.7 EXAMINATION OF CONDITIONS

- A. All areas to be planted shall be inspected by the Contractor before starting work and any defects such as incorrect grading or inadequate drainage shall be reported to the Owner's Representative prior to beginning this work.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining plants temporarily and/or re-handling plants prior to final installation.
- C. All plants are the full responsibility of the Contractor between the time of digging at the nursery and final acceptance.

1.8 REFERENCE STANDARDS

- A. Hortus III, 1976, L. H. Bailey Hortorium.
- B. Tree and Shrub Transplanting Manual, E.B. Himelick, 1991, International Society of Arboriculture.
- C. American National Standards Institute (ANSI):
- D. Z60.1 American Standard for Nursery Stock (ASNS), latest edition, published by American Nursery & Landscape Association, (ANLA).

PART 2 – PRODUCTS

2.1 PLANTING SOILS

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Planting soil for planting trees and shrubs shall be determined by mechanical analysis (ASTM D 422) and based on the "USDA Classification System" and as defined in this Section. It shall be of uniform composition, without admixture of subsoil.
- B. It shall be free of stones greater than one and one-quarter inches, lumps, plants and their roots, debris and other extraneous matter as determined by the Owner's Representative. Planting soil for trees and shrubs shall have the following grain size distribution for material passing the 1.0 mm sieve:

| Millimeter | Percent Passing by Weight | |
|------------|---------------------------|---------|
| | Maximum | Minimum |
| 2 | 100 | |
| 1 | 100 | 80 |
| 0.5 | 87 | 67 |
| 0.25 | 72 | 48 |
| 0.10 | 45 | 30 |
| 0.05 | 32 | 22 |
| 0.002 | 7 | 2 |

- 1. Maximum size shall be one and one quarter inches largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
- 2. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 8.0 or less. ($D80/D30 < 8.0$)
- C. Organic content and pH for specific planting use shall be as follows:
 - 1. All areas planted with turf grasses:
 - a. pH: 6.0 through 7.0
 - b. Organic Content 3.0 - 5.0 percent as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours)
 - 2. From 6 inches below the surface to 18 inches below the surface of all areas planted with trees and shrubs as described in this Specification:
 - a. pH: 5.5 through 6.5
 - b. Organic Content 4.0 - 6.0 percent as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours)
 - 3. Top 6 inches of all areas planted with trees and shrubs as described in this Specification:
 - a. pH: 5.5 through 6.5
 - b. Organic content 6.0 – 8.0 percent as determined by the loss on ignition of oven-dried samples passing #10 sieve (Muffle furnace temperature: 450 +/- 10 degrees C for 8 hours)
 - 4. Planting soils shall be pH adjusted for particular planting applications and shall be adjusted prior to delivery to the Project sites.
- D. Planting soil shall be free of plants and their roots, debris and other extraneous matter. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The electrical conductivity (EC2) of a 1:2 soil-water suspension shall be equal to

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

or less than 1.0 milliohms/cm. (Test minus sieve #4 material.) Planting soil shall not have levels of extractable aluminum greater than 200 parts per million. Cation Exchange Capacity (CEC) shall be greater than or equal to 12.

- E. Planting soil shall be the manufactured product of a commercial processing facility specializing in the production of manufactured soils and planting soil. Planting soil shall be manufactured from base loam, sands, and composted yard waste.
- F. On-site topsoil may not be used for the work of this Section.
- G. All planting soil proposed for use shall be tested for conformance to the specifications.
- H. The Owner's Representative reserves the right to reject on or after delivery to the project site any material which does not, in his opinion, meet these specifications.

2.2 ORGANIC AMENDMENT MATERIALS (COMPOST)

- A. Compost for amending planting soil on the Project site:
 - 1. Compost for amending planting soil: stable, humus-like material produced from the aerobic decomposition of organic residues consisting of Leaf or Yard Waste Compost which shall be composted for a minimum of one year (12 months). Compost shall be free of debris such as plastics, metal, concrete or other debris and stones larger than 1/2", larger branches and roots and wood chips over 1/2 inches in length or diameter.
 - 2. Compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.
 - 3. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1
 - 4. The project shall be stable and must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests shall be conducted by Woods End Research Laboratory, Mt. Vernon, Maine, Soil Control laboratory of California, or approved equal.
 - 5. Pathogens/Metals/Vector Attraction reduction shall meet 40 CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).
 - 6. Organic Content: at least 20 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. pH: shall be 6.5 to 7.2,
 - 7. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.0 mOhms/cm (dS/m).
 - 8. Compost: screened to 3/8 inch maximum particle size and shall contain no more than 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.

2.3 SOIL ADDITIVES

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. General: Soil additives shall be used to counteract soil deficiencies as recommended by the soils analysis and as supplements for planting soil construction as specified herein.
- B. Ground limestone for adjustment of planting soils pH shall contain not less than 85 percent of total carbonates and shall be ground to such fineness that 40 percent shall pass through 100 mesh sieve and 95 percent shall pass through a 20 mesh sieve. Contractor shall be aware of planting soils pH and the amount of lime needed to adjust pH to meet the requirements of the testing lab recommendations.
- C. Commercial fertilizer shall be a product complying with the State and United States fertilizer laws. Deliver fertilizer to the site in the original unopened containers bearing the manufacturer's certificate of compliance covering analysis and which shall be furnished to the University's Representative. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis.
 - 1. Fertilizer for planting shall be formulated for top-dressing, soil surface application to plants. Fertilizer shall be designed and certified by the manufacturer to provide controlled release of fertilizer continuously for not less than 9 months. One hundred percent of the nitrogen content shall be derived from organic materials. Nitrogen source shall be coated to ensure slow release. Fertilizer percentages of weight of ingredients shall be as recommended by the soil testing and analysis specified, performed, and paid for under this Section

2.4 GRADES AND STANDARDS OF PLANTS

- A. The Contractor shall furnish all plants shown on the Contract Documents, as specified, and in quantities listed on the PLANT LIST. No substitutions will be permitted, without written approval by the Owner's Representative.
- B. All plants shall be typical of their species or variety and shall have a normal habit of growth.
- C. Plants shall be in accordance with Standards of the ASNS American Nursery & Landscape Association except as noted in this Section. Botanical plant names shall be in accordance with plant designations included in Hortus III.
- D. If, at any time during the performance of the Contract, any plant shows signs of graft incompatibility, as determined by the Owner's Representative, then the shrub and all other similarly grafted plants of the same Genus/Species/Variety shall be rejected and removed from the site. Visual symptoms of graft incompatibility as cause for rejection include:
 - 1. Development of over-growths by rootstock or scion resulting in the development of shoulders or inverted shoulders.
 - 2. Suckering of the rootstock combined with poor growth or dieback of scion.
 - 3. Any mechanical weakness between scion and rootstock.
 - 4. Any marked difference in bark pattern and structure between scion and rootstock.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- E. All deciduous trees shall meet the following standards:
1. Trees shall have a single, straight trunk, well formed, and sturdy. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety.
 2. Trees with multiple leaders shall conform to all standards noted in this Section for single leader trees and shall be accepted only as noted on the PLANT LIST.
 3. All pruning wounds shall show vigorous bark on all edges at the time of harvest. Trees shall be free from all signs of pest and disease damage. The trunk shall be free from sun scald, frost cracks, and wounds resulting from abrasions, fire, animal damage, or other causes.
 4. Pruning scars within the crown of any tree shall be clean cut and shall leave no protrusion beyond the branch collar.
 5. All trees shall have healthy, vigorous leaves or needles of normal size, color, shape, and texture for the particular species and variety.
 6. Deciduous shade trees and deciduous flowering trees shall have fall color typical for their species and variety.
 7. Unless otherwise indicated on the PLANT LIST, the height and spread of deciduous shade trees shall be the minimum requirements.
 8. Take caliper measurements for deciduous trees 6 inches above ground level up to and including 4 inches caliper size and 12 inches above ground for larger sizes.
 9. No deciduous tree shall be pruned after the Owner's Representative has tagged the plant in the nursery except as directed by the Owner's Representative.
 10. Unless otherwise noted on the PLANT LIST, shade trees for use in paved areas shall have no branches lower than 6.5 feet from finish grade and no higher than 7.5 feet from finish grade. Flowering trees for use in areas away from pedestrian traffic shall have the first branch of their crowns no higher than 4 feet from finish grade.
 11. Branching of all deciduous trees shall be best quality representatives of the species, cultivar or variety with lateral branching around the entire trunk to form a symmetrical tree for 80 percent to 100 percent of the tree's outer perimeter. All branches on deciduous trees shall meet the trunk at angles no less than 30 degrees and no greater than 90 degrees from the vertical.

- F. All shrubs shall meet the following standards:
1. All shrubs shall be healthy and vigorous plants which are very well shaped, heavily branched, densely foliated, and true to form for the variety.
 2. Canes or Trunk(s) and Branches:
 - a. Well formed and sturdy.
 - b. Branching shall be uniformly distributed close to the ground.
 - c. Scars shall be free of rot and not exceed 1/4 the diameter of the wood beneath in greatest dimension unless completely healed (except pruning scars).
 - d. Pruning scars shall be clean cut and shall leave little or no protrusion from the trunk or branch.
 - e. Graft unions shall be completely healed.
 - f. No suckers or water sprouts.
 - g. Contain no dead wood.
 - h. Free of cracks, splits, or cambium peeling.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

3. No shrub with pest or mechanical damage will be accepted.
4. Shrubs shall show no signs of frost or winter damage to the foliage. Foliage shall not be in a state of drought stress. Leaves or needles shall show no signs of wilt or desiccation due to weather stress at any season of the year.

2.5 ROOT SYSTEMS FOR ALL PLANTS

- A. Each plant shall have an extensive, symmetrically balanced fibrous root system. Any root ball which shows signs of asymmetry, girdling, injury, or damage to the root system shall be rejected.
- B. Curling or spiraling of the roots along the walls of rigid containers will not be accepted. Curling, spiraling or girdling roots within balled and burlapped material will not be accepted.
- C. All parts of the fibrous root system of all plants shall be moist and fresh with a white color when washed of soil. When the plant is removed from the container, the visible root mass shall be healthy with white root tips. The root systems of all plants shall be free of disease, insect pests, eggs, or larvae.
- D. All shrubs which are not grown in containers must be moved with the root systems as solid units with balls of earth firmly wrapped with untreated 8-ounce natural, biodegradable fabric burlap, firmly laced with stout, natural biodegradable cord or twine.
- E. The diameter and depth of the balls of earth must encompass the fibrous and root feeding system necessary for the healthy recovery of the plant. Minimum root ball diameters and depths shall be in accordance with ASNS Standards.
- F. No plants shall be loose in the container.
- G. Container grown plants which have roots growing out of the container will be rejected.

2.6 PLANTING SOIL MIX

- A. Planting soil mix shall be as provided and spread under the work of Section 329119 and pH adjusted according to particular planting applications and improved through the addition of organic matter as directed below. Planting soil shall conform to the following pH levels:
 1. Planting soil mix for general planting of non-acid loving plants shall have a true pH value of 6.0 to 6.5. Planting soil mix shall be amended by the Contractor at his own expense to the proper pH range by mixing with dolomitic limestone as specified under Section 32 91 00 of this Specification.
 2. The amount of limestone required to adjust the planting soil mix to the proper pH range shall be approved by the Owner's Representative on the basis of soil tests performed.

2.7 MULCH

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Bark Mulch: Mulch shall be high quality, double-ground, premium bark mulch of hemlock bark, spruce and pine bark. Mulch shall have been aged for a minimum of six months and not longer than two years. Bark mulch shall be shredded to a uniform size; free of dirt, debris and foreign matter; with pieces no thicker than 1/4 inch. Mulch must be free of stringy material or chunks over 3 inches in size and shall not contain, in the judgment of the Owner's Representative, an excess of fine particles. Submit sample for the Owner's Representative approval.
- B. Geotextile fabric for weed control shall be of woven, nonwoven, spun-bonded, or needle-punched construction; composed of polyethylene, polypropylene, or polyester materials.
 - 1. Geotextile fabric shall be designed specifically as a weed control fabric and shall have porosity of not greater than 5 percent open.

2.8 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, the Owner's Representative shall furnish the Contractor upon request with an adequate source and supply of water at no charge. However, if the Owner's Representative's water supply is not available or not functioning, the Contractor shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

2.9 STAKING, GUYING AND ANCHORING OF MATERIALS

- A. Tree staking: Tree stakes shall be a below-grade stabilizing system designed to secure root balls into subsoil, structural planting medium and planting soil back fill without use of above ground components.
 - 1. Stakes shall be fabricated from steel pipe per ASTM A53 and flat bar stock per ASTM A36. Steel shall be lightly oiled to prevent scale and rust from forming prior to installation.
 - 2. Stakes shall be as shown on the Contract Documents.
 - 3. Stakes shall be sized to accommodate tree sizes noted herein. At a minimum below-grade stakes shall have long prong 42 inches in length, short prong 12 inches in length and connecting bar stock 12 inches in length.
 - 4. Provide a minimum of three stakes per tree.
- B. Drive anchors assembly shall be as manufactured by Laconia Malleable Iron Works, Laconia, NH; 'Duckbill' tree anchoring system manufactured by Foresight Industries, Inc., Cheyenne, WY; 'Ground Gripper' anchors as manufactured by A. B. Chance Co., Centralia, MO; or approved equal. Sizes used shall be in accordance with the manufacturer's specifications and recommendations.

PART 3 – EXECUTION

3.1 PLANTING

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- A. Furnishing and planting of plant material shall include, but shall not be limited to, the digging of planting pits and plant beds, amendment of planting soil as required to produce planting soil mix, provision of soil additives required to adjust for pH requirements of specific plants, furnishing the plants as specified as well as the labor of planting, fertilizing, and maintenance.
- B. Prior to spreading of planting soil, subgrades shall have been tested to determine if they are too compact to drain water as specified, performed and paid for under the work of this section.
- C. The Contractor shall locate plant material sources and ensure that plants are shipped in timely fashion for installation.
- D. Contractor shall locate all existing underground utilities that are within 10 feet of the proposed planting pits and notify the Owner's Representative of any conflicts prior to digging plant pits.
- E. Seasons for Planting:
 - 1. Spring: Deciduous materials - March 21 through May 1; Evergreen materials - April 15 through June 1.
 - 2. Fall: Deciduous materials - October 1 through December 1; Evergreen materials - August 15 through October 15.
- F. Plant Material Inspection:
 - 1. At least one month prior to the expected planting date, the Contractor shall request that the Owner's Representative provide a representative to select and tag stock to be planted under this Section. The Contractor shall pay for the transportation, subsistence and overnight accommodations, if necessary, for the Owner's Representative's representative during the period of time required to select and tag the plant material.
 - 2. The Contractor shall be responsible to certify the availability of quality plants in specified sizes from his/her sources of supply prior to requesting that the Owner's Representative make plant source inspections. In the event that plants at the inspection location are found to be unavailable or of insufficient size, the Contractor shall be liable to reimburse the Owner's Representative for all costs of the Owner's Representative's hourly services which are incurred during unproductive inspection trips.
 - 3. Unless specifically designated otherwise, a representative of the Contractor shall accompany the Owner's Representative on all plant material selection field trips.
 - 4. All trees for the project shall be individually tagged for approval with the Owner's Representative's seals, and no trees shall be accepted for delivery to the site without such seals. Representative samples only of shrubs and ground cover plants may be tagged or marked for approval as an "Approved Typical Sample" and shipped to the site. Any shrub that arrives at the construction site that does not meet the Approved Typical Sample will be rejected by the Owner's Representative.
 - 5. Plants to be inspected shall be in locations and conditions that allow direct and unobscured inspection by the Owner's Representative. Container grown or balled and

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

burlapped shrubs shall be pulled from holding blocks by the nurseryman for scrutiny by the Owner's Representative at no additional cost to the Owner's Representative. Harvested trees held in storage shall not have branches tied up. Harvested trees shall not have trunks obscured by burlap, cardboard trunk protection, or other devices that would otherwise obscure inspection. In the event that branches are tied up, trunks are obscured by burlap or cardboard trunk protection, or root flares hidden by burlap and twine and the Owner's Representative cannot inspect root flares, trunks or branching habit, the Contractor shall bear all responsibility and costs associated with tree rejection at a later date during the course of the Contract.

6. Inspection and approval of plants at the source shall not impair the right of subsequent inspection and rejection upon delivery to the site, or during the progress of the work if the Owner's Representative finds that plants do not meet the requirements of the PLANT LIST or this Contract, have declined noticeably due to handling abuse, lack of maintenance, or other causes. Cost of replacements, as required, shall be borne by the Contractor.
- G. Placement planting soil shall be specified, performed and paid for under the work of this Specification. Obtain Owner's Representative's written approval of work of rough grading and finish grading prior to starting the work of planting.
- H. Planting:
 1. Notify the Owner's Representative three working days prior to the proposed arrival of plant material on the site. If not planted within 24 hours of delivery to the site, all plants shall be maintained in an on-site nursery. Container grown shrubs stored on site shall be shaded from direct sunlight at all times and shall not be stored directly on paved surfaces. All plants delivered to the site and not planted within 24 hours of delivery shall have their root balls covered with mulch and shall be watered on a daily basis such that root balls are kept moist throughout.
 2. Locations for all trees and outlines for planting beds shall be staked on the ground by the Contractor for approval by the Owner's Representative before any plant pits or plant beds are dug. Notify the Owner's Representative no less than 3 days prior to the desired date of inspection of staking to schedule site visit.
 3. Planting beds shall be continuous and dug to the depth of the deepest root ball of the plants in the bed.
 4. Within each tree bed, hand dig tree pits. Once placed do not allow vehicles to drive over planting soil in tree beds. Remove and stockpile excavated planting soil for reuse as backfill for plant pit. All subsoil excavated from the bottoms of planting pits shall be removed from the site.
 5. Tree and shrub planting pits within beds shall be dug to the following requirements.
 - a. Plant pits for trees shall be a minimum three times greater in diameter than the diameter of the root ball. Place root ball directly on subgrade. Slope sides of tree pits at a 45 degree angle.
 - b. Individual plant pits for shrubs shall be three times greater in diameter than the diameter of the root ball. Place root ball directly on subgrade. Slope sides of shrub pits at a 45 degree angle.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- c. Plant beds for shrub massing shall be one large and continuous excavated bed. Extend bed no less than 3 feet beyond limits of shrub root balls on perimeter of bed.
 - d. Plant pits for trees shall be dug to the depth of the rootball to be planted.
 - e. Remove all soil from around the root flare of the stem of the plant and from the top of the rootball to determine the true depth of the rootball. All plants that have been planted and have root flares that are buried will be rejected.
 - 6. All plant roots and earth balls must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation, and at the site until the final planting.
 - 7. Remove container plants from containers prior to planting.
 - 8. Trees and shrubs shall be placed in the center of plant pits, plumb, with the crown of their roots exposed and located above the surrounding finish grade.
 - 9. Prior to completion of planting installations, remove rope and cut wire baskets from the top 1/3 of the root balls. Pull burlap away from the trunk or stem of the plant and cut burlap from the top 1/3 of the root balls.
 - 10. Plant pits and beds shall be backfilled with approved planting soil to the full depth of the planting pit or bed. Eliminate air pockets and compact the soil by flooding the tree pit or plant bed within 2 hours of planting installation. After water has drained from the planting pit or bed and planting backfill has dried enough additional planting soil shall be spread in pit or bed to bring the finished surface of the planting pit or bed to grades shown on the Contract Documents. A saucer shall be formed around each plant at a depth of 3 inches for trees and for shrubs.
 - 11. Fertilizer shall be spread over the plant saucer or plant bed between the saucer and the edge of the rootball. Till the fertilizer into the soil to a depth of four inches prior to the placement of the planting mulch. Fertilizer shall be provided, spread and paid for under this section. Do not mulch until placement of the fertilizer has been verified by the Owner's Representative. Fertilizer application rates shall be as determined by soil testing, analysis, and testing laboratory recommendations specified, performed and paid for under this section.
 - 12. All plants shall be inoculated with mycorrhizal fungi. Inoculant shall be added after the plants have been placed in their holes. Open the required number of packets for each plant and thoroughly mix the inoculant powder into the upper 10 inches of backfill soil.
 - a. Mycorrhizal fungal inoculant shall be added to the plant pits according to plant size.
 - b. The application rates for mycorrhizal fungal packets shall be in accordance with the manufacturer's recommendations.
- I. All plants shall be watered immediately following planting as necessary to thoroughly moisten rootball and plant pit planting soil and thereafter shall be inspected frequently for watering needs and watered, as required, to provide adequate moisture in the planting pit. The Contractor shall inspect tree pits 24 hours after initial watering to confirm that they are draining properly. If surface water or excessively saturated plant pit soils exist, the Contractor shall immediately notify the Owner's Representative. The Owner's Representative will recommend remedial measures based upon site conditions.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- J. Keeping Trees Plumb:
- K. All trees shall be firmly staked with approved below-grade stabilizing system at the time of planting. Stakes shall be installed as follows:
1. After trees have been backfilled but prior to forming saucer install below-grade staking system.
 2. Place stakes so that the long prongs are set at 120 degree points around root ball. Long prongs shall be set against edge of rootballs but shall not pierce burlap of ball's vertical face.
 3. Short prongs shall be placed in a counter clockwise rotation around top of rootball. Horizontal bar stock and short prongs shall be placed no closer than 4 inches from the trunk of the tree. In no circumstances shall horizontal bar stock press against visible root flares.
 4. Drive long prongs into the subsoil, planting soil, structural planting medium to full depth so that horizontal bar is pressed firmly into burlap and top surface of rootball. Short prongs shall driven into rootball so that top of short prongs will not protrude above bark mulch.
 5. Do not penetrate aeration piping with filter fabric sleeves when driving below-grade stakes.
 6. Rake out planting soil around and above rootball to ensure a smooth surface with intact saucer.
- L. Mulch material shall be placed over entire saucer areas of individual trees and shrubs and over the entire area of planting beds to a depth of 3 inches after settlement, not later than one week after planting. Do not apply mulch prior to the first watering of plant materials. Do not apply mulch prior to placement of surface applied fertilizer and verification of placement by the Owner's Representative.
- M. The trunks of all deciduous trees over 1-1/2 inches in diameter shall be wrapped by the Contractor immediately after the inspection of the trees by the Owner's Representative. Wrapping shall extend from the ground line to the height of the second branches or to the height directed. The specified wrapping shall be wound spirally, starting from the base and overlapping 1-1/2 inches (40 mm) in order to shed water. Wrapping shall be securely taped to prevent loosening and unraveling. If trees are planted in springtime, do not apply any tree wrapping. If deciduous trees are planted in the autumn, wrap the trees and then remove wrapping the following spring.
1. Trees delivered to the site wrapped for protection shall be unwrapped at the site for inspection of the trunk by the Contractor and Owner's Representative.
- N. Pruning:
1. As directed by the Owner's Representative, each plant shall be pruned in accordance with the workmanship requirements of "Pruning Standards" for Class I, fine pruning, to preserve the natural character of the plant.
 2. Tree pruning, as required, shall be undertaken to the full height of affected trees.
 3. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- O. If planting is done after lawn preparation or installation, proper protection of lawn areas shall be provided. Any damage resulting from planting operations shall be repaired immediately at no cost to the Owner's Representative. Repair work shall be as specified and installed under the work of Division 32 Section, LANDSCAPING of this Specification and paid for under this Section.
- P. Protect existing lawns from damage. Any damage resulting from planting operations shall be repaired immediately at no cost to the Owner's Representative. Repair work shall be as specified and installed under the work of Division 32 Section, LANDSCAPING, of this Specification and paid for under this Section.
- Q. In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work, alternate locations will be selected by the Owner's Representative. Relocation of plant pits or beds shall be provided at no additional cost to the Owner's Representative. Provide the Owner's Representative with no less than 48 hours notice of obstruction so that a site visit can be scheduled to establish new locations for plants.
- R. Absolutely no debris may be left on the site. Repair any damage to site as directed by the Owner's Representative, at no additional cost.

3.2 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted and shall continue for a minimum 30-day Monitoring Period and until Final Acceptance.
- B. Maintenance shall consist of keeping the plants in a healthy growing condition and shall include but is not limited to watering, weeding, cultivating, pruning, re-mulching, tightening and repairing of guys, straightening of trees to a plumb position, removal of dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.
 - 1. Plants shall be inspected for watering needs at least twice each week and watered to promote plant growth and vitality. The following watering rates assume that the soil is free draining. If the on-site conditions do not ensure a free draining soil, then notify the Owner's Representative in writing of this condition. Watering rates for trees and shrubs in free draining soils are presented here as guidelines to ensure that the top six inches of plant bed soil remains moist at all times. Actual watering rates may vary depending upon soil conditions.
 - a. Water shall be applied by 1 inch diameter hose with an attached metering gauge.
 - 2. For trees in lawn or mulched beds, apply water to the ground surface directly under the canopy. Water shall be applied at a sufficiently slow rate to prevent run off from the soil surface but great enough to equal 0.2 inches of water per square foot of canopy area per hour for 5 hours per week.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

3. Planting beds and individual plant pits shall be kept free of weeds, and mulch shall be replaced as required to maintain the specified layer of mulch. Beds and individual pits shall be neat in appearance and maintained to the designed layout.
 4. Plants that die during the maintenance period shall be removed and replaced by the Contractor within one week of notification and replaced during that growing season, unless directed otherwise by the Owner's Representative.
 5. Spraying of insecticides or herbicides shall be done by State-licensed professionals. Spraying for insects, pests and diseases shall conform to the National Arborist Association Standards under the section entitled "Standards for Pesticide Application Operations", as currently adopted and as approved by the Owner's Representative. All insecticides, pesticides, and herbicides shall be EPA-approved and shall conform to the requirements MCRG: Massachusetts Control Recommendation Guide for Insect, Disease, and Weed Pests of Shade Trees and Woody Ornamentals, latest edition, University of Massachusetts, Amherst, College of Food and Natural Resources.
 6. Work of pruning, fertilizing, spraying, and similar activities shall be undertaken only by Certified Arborists and licensed chemical applicators, as pertinent to the work being performed.
- C. During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturalists to inspect plant materials and to identify problems and recommend corrective procedures. The Owner's Representative shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Owner's Representative.

3.3 MIXING PLANTING SOIL OFF SITE

- A. Soil additives shall be thoroughly incorporated into planting soil by harrowing or other methods standard to the industry. The following soil additives shall be incorporated:
 1. Ground limestone or acidulant as required by soil analysis to achieve the required pH as described in this Section. Incorporate limestone at the rate required by soil analysis

3.4 GENERAL

- A. The Contractor shall provide sufficient planting soil to complete the work of this Section.
- B. Planting soil shall be obtained from a commercial processing facility specializing in the manufacturing of planting soil.
- C. Planting soil shall be manufactured sufficiently in advance of the planting and seeding operations so cause no delay in the work described in Sections 329100 Planting and 329119 Landscaping.
- D. Deliver planting soils to the Project site in tarpaulin-covered trucks. Stockpile in locations approved by the Owner's Representative.

- E. Stockpiled planting soils shall be protected from erosion and sedimentation in accordance with the relevant provisions of Section 312500 Erosion and Sedimentation Controls, of this Specification.

3.5 FILLING AND COMPACTION

- A. Perform all earthwork in accordance with Division 31 Sections of this Specification.
- B. Perform percolation tests on existing sub-soils or placed fill prior to placing and spreading planting soil:
 1. Perform percolation testing of subsoil or placed fills to determine whether or not the subgrade will drain properly. Perform percolation tests as specified in this Section for each lift of planting soil.
 - a. In the presence of the Owner's Representative, record percolation rates in undisturbed subsoil. This will serve the Owner's Representative in determining whether de-compaction of subgrade will be required.
 - b. In the event that percolation testing indicates that the subsoil, placed fills or ordinary borrow has been over compacted and will not drain, the contractor shall loosen up the top 18 inches of the subgrade by ripping or other mechanical means.
 2. Perform sufficient percolation tests in areas of poorly draining or compacted subsoil or compacted placed fills as directed by the Owner's Representative to ensure that these underlying soils drain. Likewise, perform sufficient percolation tests after ripping and loosening to ensure that the soils are no longer too compact to drain.
- C. Clear the subgrade of all construction debris, trash, rubble and any foreign material and remove from the site and disposed of in a legal manner.
- D. Protect adjacent walls, walks and utilities from damage or staining by the planting soil.

3.6 FINE GRADING

- A. Immediately prior to dumping and spreading planting soil in locations shown on the Contract Documents, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried. Notify the Owner's Representative that the subsoil has been cleaned and request his/her attendance on site to review and approve subgrade conditions prior to spreading planting soil.
- B. If so required by the Owner's Representative, additional soil sampling and testing shall be performed in accordance with SUBMITTALS paragraph of this Section. If additional soil testing is required by the Owner's Representative the Contractor shall refrain from spreading planting soil until soil test reports have been submitted to the Owner's Representative and have been accepted. All planting soil delivered to the site that, upon additional on-site testing, fails to meet the requirements of this Section, shall be removed from the Project site at no additional cost to the Owner's Representative.
- C. Planting soil delivered to the site shall be protected from erosion at all times. Materials shall be spread immediately upon delivery to the Project site. Otherwise, materials that set on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

acceptable to the Owner's Representative and surrounded by silt fence as specified under the work of the Section 312500 of this Specification.

- D. Place planting soil in multiple lifts. Place the first lift to a depth of 2 inches and harrow or till the planting soil into the underlying subsoil to a depth of 2 inches, creating a blended interface of planting soil and subsoil approximately 4 inches deep. Spread the subsequent lifts of planting soil to depths specified in this Section.
- E. No planting soil shall be handled, planted, or seeded in any way if it is in a wet or frozen condition. A moist planting soil is desirable.
- F. After planting soil has been spread in plant beds and tree pits, spread yard waste compost to a depth of 2 inches and till the planting soil to a depth of 8 inches to integrate compost into the top layer of the planting soil.
- G. After planting soil has been spread in turf areas, spread fertilizer and limestone across the surface of the spread planting soil and till the planting soil to a depth of 6 inches to integrate fertilizer and limestone into the top layer of the planting soil.
- H. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter from the planting soil. Remove from unscreened soils all stones over 1 inch in diameter from the top 6 inches of the planting soil bed.
- I. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Deviation from indicated elevations that are greater than one-tenth of a foot shall not be permitted. Connect contours and spot elevations with an even slope. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.
- J. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional planting soil and the surface shall be re-graded and rolled until presenting a smooth and even finish corresponding to the required grades.
- K. The Contractor shall install planting soil in successive horizontal lifts no thicker than 6 inches in turf areas and 12 inches in plant bed areas to the desired compaction as described herein. The Contractor shall install the soil at a higher level to anticipate any reduction of planting soil volume due to compaction, settling, erosion, decomposition, and other similar processes during the warranty period. The Owner's Representative will ensure that the full depths of planting soil for lawn and plant beds are obtained by digging holes in the planting soil at the same frequency as for compaction testing.
 - 1. Compact planting soil to the required density as specified herein.
 - 2. Maximum dry density for planting soil shall be determined in accordance with ASTM D698. In turf and planting beds and tree pits the following percentages of minimum to maximum dry densities shall be achieved:

| | |
|---------|---------|
| Minimum | Maximum |
| 80% | 85% |
 - 3. The surface area of each lift shall be scarified by raking prior to placing the next lift.
- L. In addition to the range cited above, compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The planting

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

soil in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the planting soil installation, the soil should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift. After the placement of each lift, perform percolation tests to determine if the soil has been over compacted. Perform the following percolation test procedure:

1. Dig a hole in the installed soil that is a minimum of 4 inches in diameter. Holes in 6-inch lift in turf areas shall be 4 inches deep. Holes in 12-inch lifts in plant beds shall be 8 inches deep. Do not penetrate through the lift being tested.
 2. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
 3. In the event that the water drains at a rate less than was recorded for existing subsoil or less than one inch per hour (whichever is slower), till the soil to a depth required to break the over compaction.
 4. Perform a minimum of one soil percolation test per 5,000 square feet area of turf area and 2,500 square feet of tree and shrub planting area as directed by the Owner's Representative.
- M. Select equipment and otherwise phase the installation of the planting soil to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil. Movement of tracked equipment over said soils will be reviewed and considered for approval by the Owner's Representative. If it is determined by the Owner's Representative that wheeled equipment must travel over already installed soil, provide a written description of sequencing of work that ensures that compacted soil is loosened and un-compacted as the work progresses or place one-inch thick steel plate ballast (or equivalent ballast approved by the Owner's Representative) over the length and width of any travel way to cover planting soil to protect it from compaction.
- N. Disturbed areas outside the limit of lawn work shall be graded smooth and spread with a minimum of 6 inches of planting soil to the finished grade.
- O. Contractor shall be responsible for maintaining all stockpiles of planting by the Owner's Representative. Contractor shall remove all excess, unused planting soil from the site after acceptance of planting and seeding operations and dispose of it in a legal manner

3.7 ACCEPTANCE

- A. Upon completion of all planting work, the Contractor shall request in writing that the Owner's Representative formally inspect the planting work.
- B. If plant materials and workmanship are acceptable, the Owner's Representative will issue a written Certificate of Conditional Acceptance to the Contractor.
- C. Following the issuance of the Certificate of Conditional Acceptance to the Contractor, the Contractor shall maintain the plants for a minimum 30 day Monitoring Period. At the end of the Monitoring Period, the plant material will be inspected by the Owner's Representative to determine whether or not all planting work has been performed to the requirements of this Section.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. Acceptance Standards at end of the Monitoring Period: If plant material is reviewed when it is in full leaf, leaves shall be plump with water with a shape indicative of the species and shall be free of insect, pest and disease damage. Twigs shall have living cambium for their full length. Twigs and branches shall have a full bud set for their full length, including terminal buds. Trunks and branches shall be free of frost cracks; sun scald; damage due to insects, pests, and disease; structural defects; and damage resulting from machinery or tools. Plant material inspected and reviewed when the plants are not in full leaf shall have twigs, branches and trunks meeting the above requirements. All plants regardless of the season of review shall have a minimum of 75 percent healthy, balanced branching structure with a healthy terminal leader(s) with viable terminal bud(s).
- E. If any number of plants do not meet these Acceptance Standards at the time of inspection, or if in the Owner's Representative's opinion, workmanship is unacceptable, written notice will be given by the Owner's Representative to the Contractor in the form of a punch list, which itemizes necessary planting replacements and/or other deficiencies to be remedied. The Contractor's responsibility for maintenance of all plants shall be extended until replacements are made or other deficiencies are corrected. All plants that do not meet these Acceptance Standards shall be removed from the project within seven days of receipt of the punch list. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner.
- F. Following the correction of all Punch List deficiencies, the Contractor shall request in writing that the Owner's Representative formally inspect the planting work. If plant materials and workmanship are acceptable, the Owner's Representative will issue a written Certificate of Final Acceptance to the Contractor.

3.8 GUARANTEE

- A. The date of the Certificate of Final Acceptance shall establish the commencement of the required one-year guarantee and establishment period for planting work.
- B. At the end of the guarantee and establishment period, a final inspection will be held to determine whether any plant material replacements are required. Each plant shall be plumb, shall have a character that is natural for its species as determined by the Owner's Representative, and shall conform to the Acceptance Standards described in this Section. Plants found to be unacceptable shall be removed promptly from the site and replaced according to this Section. A final inspection will be made after the replacement plants have lived through one year.
- C. All replacements shall be plants of the same kind and size specified in the replacements due to vandalism or neglect on the part of others.

END OF SECTION

SECTION 329119

LANDSCAPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Submittals.
 2. Topsoil.
 3. Fertilizer.
 4. Seed.
 5. Mulch.
 6. Asphalt emulsion.
 7. Preparation of seed bed.
 8. Fertilizing.
 9. Seeding.
 10. Mulching.
 11. Emulsion.
 12. Maintenance.
- B. The Contractor shall restore and replace shrubbery, fencing, sod, or other disturbed surfaces or structures to conditions equal to that before the work began and to the satisfaction of the Engineer and Owner.
- C. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.
- D. All landscaping and restoration shall be performed to the satisfaction of the Owner.

1.3 SUBMITTALS

- A. The Contractor shall submit manufacturer's data for all products to be applied for lawn restoration and landscaping. Submit detailed plans showing landscaping to be performed.
- B. All landscape plans shall be approved by the Owner and Engineer prior to installation. Application of unapproved materials shall be replaced by the Contractor at no cost to the Owner.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall not contain more than 40 percent clay in that portion passing a No. 10 sieve and shall contain not less than 5 percent or more than 20 percent organic matter as determined by loss on ignition of samples oven-dried to constant weight at 212 Degrees Fahrenheit.

2.2 FERTILIZER

- A. Fertilizer shall be lawn or turf grade 12-12-12.

2.3 SEED

A. Lawn Areas

1. All areas to be seeded which are lawn areas, whether residential, commercial, or office areas, where lawns are, or have been regularly maintained, shall be seeded with the following mixture or a mixture as required by the Soil Conservation District or other governing authority: (Percentages are by weight.)
 - a. 40 percent Kentucky Bluegrass (*Poa pratensis*); 40 percent Creeping Red Fescue (*Festuca rubra*); and 20 percent Annual Ryegrass (*Lolium multiflorum*).
2. Where sod is required, the sod shall be green, freshly cut, and of good quality with grass free from all noxious weeds. It shall contain all the dense root system of the grass and shall not be less than 1/2" thick.

B. All Other Areas

1. All other areas shall be seeded with the following mixture:
 - a. 90 percent Perennial Ryegrass (*Lolium perenne*) and 10 percent Alsike Clover (*Trifolium hybridum*)

2.4 MULCH

- A. Mulch shall be straw reasonably free of weed seed and any foreign materials which may affect plant growth. Other materials may be used if approved by the Engineer.

2.5 ASPHALT EMULSION

- A. Emulsion shall be non-toxic to plants and shall conform to AASHTO M140 or AASHTO M208.

PART 3 - EXECUTION

3.1 PREPARATION OF SEED BED

A. Topsoil Areas

1. If suitable topsoil is available as part of the excavated material it shall be removed, stored, and used to backfill the top 4 inches of the excavation. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the topsoil carefully brought to the finished grade by raking.

B. Non-Topsoil Areas

1. In lawn areas where there is a deficiency of suitable topsoil, the Contractor shall furnish 4 inches of topsoil to be used as a seed bed.
2. In areas not considered lawn areas, and where approved by the Engineer, the trench backfill may be used as a seed bed. After the backfill has been given a reasonable time to settle, it shall be graded off to the finished grade and harrowed to a depth of 3 inches. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the soil carefully brought to the finished grade by raking.

3.2 FERTILIZING

- A. Fertilizer shall be uniformly applied to all areas to be seeded at the rate of 1 pound per 100 square feet in topsoil or 2 pounds per 100 square feet in non-topsoil. The fertilizer shall be thoroughly disked, harrowed, or raked into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, the Contractor shall rework the surface until it is a fine, pulverized, smooth seed bed, varying not more than 1 inch in 10 feet.

3.3 SEEDING

- A. Immediately after the preparation and fertilization of the seed bed, the seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rate of 3 pounds per 1,000 square feet. Seed shall be sown dry or hydraulically. After sowing, the area shall be raked, dragged, or otherwise treated to cover the seed to a depth of approximately 1/4".
- B. Areas with slopes greater than 10% shall be sodded.

3.4 MULCHING

- A. Within 48 hours after any given area is seeded, mulching material shall be evenly placed over all seeded areas at the rate of approximately 2 tons per acre, when seeding is performed between the dates of March 15 and October 15 of the same year, and at the approximate rate of 3 tons per acre when seeding is performed between the dates of October 15 and March 15 of the succeeding year.

3.5 EMULSION

- A. Mulching materials shall be kept in place with asphalt emulsion applied at a minimum rate of 60 gallons per ton of mulch or by methods as are approved or may be otherwise required to prevent displacement of material. Mulching which is displaced shall be replaced at once but only after

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

the seeding or other work which preceded the mulching and which work was damaged as a result of displacement of mulching material has been acceptably repaired.

3.6 MAINTENANCE

- A. All seeded and sodded areas shall be carefully maintained, tended, and watered by the Contractor as necessary to secure a good turf. Settled areas shall be filled, graded, and reseeded or resodded. The Contractor shall be responsible for the condition of the seeded and sodded areas for a period of one year from the date of final completion.

END OF SECTION

SECTION 333913

MANHOLES, FRAMES AND COVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Submittals and certifications.
2. Cast-in-place manholes.
3. Pre-cast manholes.
4. Castings, frames, and covers.
5. Brick.
6. Mortar.
7. Cement.
8. Hydrated lime.
9. Sand.
10. Manhole steps.
11. Waterproofing.
12. Bedding material.
13. Inspection and tests.

- B. The work covered by this Section includes the furnishing of all plant, labor, materials, equipment, and appliances; and performing all operations in connection with the satisfactory installation of manholes as shown on the plans, as herein specified, and as directed by the Engineer.
- C. The work shall also include inspection and testing, brick inverts, rims and covers, boots, excavation, refill, and all incidental work, required for a complete job in strict accordance with the Specifications, applicable drawings, and standard details.
- D. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 SUBMITTALS AND CERTIFICATIONS

- A. Shop drawings and manufacturer's Certificates of Compliance shall be furnished for all pre-cast material, manhole covers, frames, grates, steps, lining material and incidentals.
- B. Certified test results of pull-out tests and load bearing tests on manhole steps shall be furnished.
- C. Representative samples of all pre-cast material, manhole covers, frames, grates, steps, lining material and incidentals shall be furnished as required for laboratory testing.

PART 2 - PRODUCTS

2.1 GENERAL

- A. It is the intention of these Specifications that the manhole, including all component parts, have adequate space, strength, and leakproof qualities considered necessary for the intended service. Space requirements and configurations shall be as shown on the drawings. Manholes may be an assembly of pre-cast sections with steel reinforcement, and approved jointing, or concrete cast monolithically in place with reinforcement. In any approved manhole, the completed structure shall be of such material and quality as to withstand loads of 8 tons (H20 loading) without failure and prevent leakage in excess of one gallon per day per vertical foot of manhole, continuously for the life of the structure. A period generally in excess of 25 years is to be understood in both cases. It is further intended that any pointing of joints shall be accomplished after leakage tests have been satisfactorily completed except as noted in Paragraph 8 of this Section.
- B. Where manholes of greater inside diameter than 4'-0" are required, the larger diameter (5'-0", 6'-0", etc.) barrel sections shall be provided from the invert of the manhole up to the cone section of the manhole. Intermediate transition sections which reduce the larger manhole inside diameter down to 4'-0" shall not be used and shall not be accepted, unless otherwise directed by the Engineer and the Owner.
- C. When the manhole depth is less than 6 feet and where a shallow manhole is indicated on the Contract Drawings, a reinforced concrete slab top shall be used in lieu of a cone section. The reinforced concrete slab top shall have an eccentric entrance opening and shall be capable of supporting H-20 loads. Refer to Shallow Manhole Detail on the Contract Drawings.
- D. Manholes shall be as shown on the standard details and as described herein.
 1. Base sections shall be monolithic to a point 6" above the crown of the incoming pipe, and shall be pre-cast reinforced concrete, except for special manholes which are cast-in-place.
 2. Horizontal joints between sections of pre-cast concrete barrels shall be of a type approved by the Engineer, which type shall, in general, depend for water-tightness upon an elastomeric or mastic like sealant.
 3. Pipe to manhole joints shall be only as approved by the Engineer and, in general, shall depend for water-tightness upon an approved flexible manhole sleeve as shown on the Contract Drawings.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

4. Cone sections shall be eccentric - see standard detail.
5. Manhole steps shall be used for manholes greater than 15 vertical feet and as directed by the Owner. If used the manhole steps shall be pre-cast into manhole sections at the factory during fabrication.
6. All pre-cast sections and bases shall have the date of manufacture and the name or trademark of the manufacturer impressed or indelibly marked on the inside wall.
7. Dimensions and construction of drop manholes to be similar to typical manholes except as shown on the plans.
8. External drop sewer manholes shall be manufactured by L & L Concrete Products, Inc. P.O. Box 516, Webster, MA 01570 or approved equal. See detail.

2.2 PRE-CAST MANHOLES

- A. Pre-cast concrete barrel sections, cones and bases shall conform to ASTM C 478 except as may be otherwise shown on the Standard Details.

2.3 CASTINGS, FRAMES, AND COVERS

- A. Manhole covers shall be 30 inches in diameter and shall have the applicable utility identified in 3-inch capital letters cast into the top surface (i.e., "SEWER", "WATER", "ELECTRIC", etc.). Manholes shall also have the manhole number (per Drawings) cast into the manhole cover.
- B. The castings shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined at the foundry, before shipment to prevent rocking of covers in any orientation. Cover pick holes shall not be through holes when cover is seated.
- C. All castings shall be thoroughly cleaned and subject to a careful hammer inspection.
- D. Castings shall be at least Class 30 conforming to the ASTM Standard Specification for Gray Iron Castings, Designation A48.
- E. Bolted and Gasketed Covers. Manholes located in cross country areas (i.e. not in streets or paved areas) or as shown on drawings shall be provided with bolted and gasketed covers. The covers shall be type R-1916-H1 as manufactured by Neenah or approved equal and shall be fastened down with (4) bolts.
- F. Watertight manhole frames and covers shall be provided where indicated on the Contract Drawings. Watertight frames and covers shall have an inner lever locking lid and shall be type LBW328 as manufactured by LeBaron Foundry, Inc. – Brockton, Massachusetts or approved equal.

2.4 BRICK

- A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Brick shall comply with ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
- B. Rejected brick shall be immediately removed from the work.

2.5 MORTAR

- A. Mortar shall be composed of portland cement, hydrated lime, and sand, in the proportions of 1 part cement to $\frac{1}{2}$ part lime to $4\frac{1}{2}$ parts sand, (by volume). The proportion of cement to lime may vary from 1: $\frac{1}{4}$ for hard brick, but in no case shall the volumes of sand exceed three times the sum of the volume of cement and lime.

2.6 CEMENT

- A. Cement shall be Type II portland cement conforming to ASTM C-150, Standard Specifications for Portland Cement.

2.7 HYDRATED LIME

- A. Hydrated lime shall be Type S conforming to the ASTM Standard Specifications for Hydrated Lime for Masonry Purposes, Designation C207.

2.8 SAND

- A. Sand shall consist of inert natural sand conforming to the ASTM Standard Specifications for Concrete (Fine) Aggregates, Designation C33 as follows:

| GRADING: | <u>Sieve</u> | Percent <u>Passing</u> |
|----------|--------------|---------------------------|
| | #3/8 | 100 |
| | 4 | 95-100 |
| | 8 | 80-100 |
| | 16 | 50-85 |
| | 50 | 10-30 |
| | 100 | 2-10 |

Fineness Modulus 2.3-3.1

2.9 MANHOLE STEPS

- A. Manhole steps shall be aligned vertically, spaced 12" on center, and cast into the manhole section as it is being formed. Manholes 15' and greater shall contain manhole steps.
- B. Prior to casting in the manhole, steps shall be wiped free from all dirt, grease, oil, and other foreign substances. After the contact period, the steps shall be rinsed with clean water and thoroughly dried.
- C. Immediately after the steps have been dried those parts which will be embedded in the manhole wall shall be given two (2) coats of an approved, heavy-bodied, bituminous material.

2.10 WATERPROOFING

- A. All precast concrete manhole sections to be installed under this Contract shall be supplied with a factory-applied bituminous waterproofing compound on the exterior surfaces. Bituminous waterproofing compound may be trowel, brush or spray applied in accordance with the manufacturer's recommendations. The waterproofing coating shall completely fill all crevices, grooves, and voids creating a continuous coating that is free of breaks, pinholes and other defects. Bituminous coating shall be carried over exposed exterior edges of manhole joints and openings. Bituminous waterproofing coating shall be Hydrocide 600, 700 or 700B as manufactured by Sonneborn division of ChemRex, Inc. or acceptable approved equal.

2.11 BEDDING MATERIAL

- A. Bedding material shall consist of crushed stone which meets the requirements of ASTM Designation C33, gradation No. 67 (3/4" to No. 4).

2.12 Powder: 1 Water by volume

PART 3 - EXECUTION

3.1 GENERAL

- A. Manholes shall be constructed at the locations, to the elevations, and in accordance with notes and details shown on the Drawings.
- B. Pre-cast bases shall be placed on a 6" layer of compacted bedding material. The excavation shall be properly dewatered while placing bedding material and setting the base or pouring concrete. Water-stops shall be used at the horizontal joint of poured-in-place manholes.
- C. Inlet and outlet stubs shall be connected and sealed in accordance with the manufacturers recommended procedure, and as shown on the Standard Details.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- D. Barrel sections and cones of the appropriate combination of heights shall then be placed, using manufacturers recommended procedure for sealing the horizontal joints, and as shown on the Standard Details or the remaining barrel of the manhole shall be cast above the base. A double ring of mastic sealant shall be used to seal the joints between manhole riser sections. All joint surfaces shall be thoroughly cleaned prior to placement of the sealant so as to be completely free of stones, sand, soil, debris, and other materials that could adversely affect sealing of the joints.
1. Following setting of the cone section, the frame and cover or some other means of preventing accidental entry by unauthorized persons, children, animals, etc., shall be placed on the top of the structure until the Contractor is ready to make final adjustment to grade.
- E. Only clean bricks shall be used in brickwork for manholes. The brick shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid. Each brick shall be laid in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling and shall be thoroughly bonded as directed.
1. Brick masonry shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved means, and shall be protected from the weather and frost, all as required.
- F. Manhole Frames. Manhole frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the drawings. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made water-tight. A minimum of 2 courses and a maximum of 6 courses of brick masonry shall be set between the manhole frame and top of concrete manhole wall. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and be sloped to shed water away from the frame.
1. Manhole covers shall be left in place in the frames upon completion of other work at the manholes.
- G. The Contractor shall connect existing sewer lines to new sanitary sewer manholes where indicated on the Contract Drawings or as directed by the Engineer. The Contractor shall excavate, remove, and replace all existing pipe that is damaged. The existing pipe shall be removed back to solid pipe which, in the opinion of the Engineer, is undamaged and free of defects. The existing pipe shall be disconnected at a joint or sawn to give a smooth end to permit a clean butt joint with connector. The new pipe shall be the same size as the existing pipe. The new pipe shall be connected to the existing pipe with watertight split-ring or other approved repair couplings.

3.2 MANHOLE LINING

- A. The optimal temperature for handling and applying the materials in the manhole is 65-80°F. Store materials within the 65° to 80°F range for 48 hours prior to use. At material temperatures below 65°F, the application becomes more difficult and curing is retarded. Above 85°F material working time is reduced.
- B. Cover the manhole invert channel to prevent washed debris from entering the sewer line.
- C. All surfaces to be lined must be cleaned and examined to ensure that they are free of laitance, dust, loose particles, oils, grease, chemical contaminants and previously applied paints or protective coatings.
- D. All active hydrostatic leaks must be stopped with leak sealant, as appropriate, prior to lining application.
- E. If chemical cleaning is utilized to remove contaminants, substrate must be neutralized. If abrasive or high-pressure water blasting is used as the method of surface preparation, all sand and/or debris must be removed by thoroughly vacuuming the area with an industrial vacuum cleaner. If surface does not have desired conditions, repeat surface preparation procedure.
- F. The installation or application of all products or materials specified under this section of the Specifications shall be done in strict accordance with the manufacturer's recommendations and instructions.
- G. The Contractor shall demonstrate the proposed lining material on a sample area which is representative of a job site application, at the request of the Engineer.
- H. The material shall be mixed and applied in strict accordance with the printed instructions of the approved manufacturer and as directed by the Engineer.
- I. The Contractor shall submit evidence indicating that the proposed applicators are fully qualified to perform the work and any proposed applicator found to be unqualified shall be removed by the Contractor.
- J. Manhole entry of certified applicators is not required to line the interior wall. If entry is necessary for any reason, OSHA standards for confined space entry will be strictly enforced.
- K. Surface Preparation
 - 1. Concrete surfaces that have been cured with conventional curing compounds or are contaminated with form oils or grease shall be chemically cleaned or scarified to remove the surface contaminants prior to abrasive blasting or hydroblasting.
 - 2. Suitably finished concrete must have a uniform surface texture, exposing fine aggregate and resembling coarse sandpaper. If surface texture is not uniform in appearance, repeat abrasive blasting or hydroblasting until the desired surface is obtained.
 - 3. All voids, holes, rough or irregular concrete shall be filled with substrate filler material to create a uniform surface with existing concrete.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

4. Old concrete shall be hydroblasted to achieve hard firm surface. All active hydrostatic leaks shall be stopped by use of an appropriate water stop, waterproofing, or urethane grout. Structural defects, voids, or cracks in substrate shall be repaired prior to lining application. Fill in defects and voids with substrate filler material.
5. In old brick manholes, all oil, grease and chemicals shall be removed from the brick by chemical cleaning, prior to hydroblasting or abrasive blasting. All paints and/or protective coatings shall be removed from the brick by hydroblasting or abrasive blasting. All foreign particles and attacked or unsound mortar shall be removed from the joints. Loose brickwork and voids in the mortar joints shall be regouted with the appropriate corrosion-resistant mortar to ensure structural integrity of the manhole. All active hydrostatic leaks shall be stopped prior to application of the corrosion resistant coating.
6. After all cracks, voids and other deficiencies have been repaired and after all leaks have been repaired, the surface of the manhole interior shall be inspected for worm and/or bug holes or other defects that could cause blistering in the lining material. All such areas shall be repaired with the substrate filler material.

L. Repair of Active Leaks

1. After surface cleaning, all visible leaks shall be stopped and sealed using leak sealant as appropriate. Manufacturer's recommendations shall be followed in using any of these materials.
2. Once the leak repair material has reached the recommended curing time, manholes shall be visually inspected to determine whether or not the leaks have been stopped. Should there be remaining visible leakage, the leak repair procedure shall be repeated. This process shall be repeated until the manhole reaches an acceptable "dry" condition (i.e. no visible leaks).

M. Lining Application

1. Once the manhole surface has been properly prepared in accordance with the lining manufacturer's recommendations, the lining material can be applied.
2. The components of the lining material shall be mixed at the site and only in complete batches. Mixing shall be done gradually and to a uniform consistency. Material that has begun to set shall not be used and shall be discarded. Retempering of the material shall not be allowed. Solvents, additives or other adulterants shall not be added to any component or mixed material.
3. The entire batch of lining material shall be removed from the mixer when mixing is complete to prevent build-up in the mixing equipment. While one batch is being used (applied) another batch shall be mixing so as to allow for continuous application of the lining material and minimize delays.
4. The lining material shall be continuously applied, to the extent practicable, to a uniform thickness in strict conformance with the manufacturer's recommendations and requirements. Once the lining material has been applied to the desired/required thickness, the entire surface (lined) shall be brushed or wiped to a smooth finish.
5. The minimum allowable thickness of the applied lining material, after curing, shall be 0.5 inch unless otherwise recommended by the manufacturer and approved by the Engineer.
6. Once the lining process is completed, the manhole shall be covered to prevent air drying and evaporation. In arid conditions or high temperatures, commercial curing compounds

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

- may be applied, as approved by the Engineer. Particular care shall be exercised when the mix water content is at the lower end of the prescribed range to prevent surface cracks.
7. Once the lining material has cured sufficiently, a holiday detector shall be used to check for pinholes, bubbles and other defects. The lining surface must be smooth, continuous and free of pinholes, bubbles or other defects. Any areas containing pinholes, bubbles or other defects shall be repaired and retested.

3.3 INSPECTIONS AND TESTS (REQUIRED FOR SEWER MANHOLES)

A. Leakage Tests

1. Leakage tests shall be made and paid for by the Contractor and observed by the Engineer on each manhole. Prior to backfilling, all manholes shall be vacuum tested. After backfilling, the manholes shall be retested using either the vacuum test or exfiltration test. The exfiltration test and vacuum tests shall be made as described below.

B. Preparation for Test

1. After the manhole has been assembled in place, all lifting holes and those exterior joints within 6 feet of the ground surface shall be filled and pointed with an approved non-shrinking mortar. The test shall be made prior to placing the shelf and invert and before filling and pointing exterior horizontal joints below the 6-foot depth line or any interior horizontal joints, boots or pipe entrances. If the groundwater table has been allowed to rise above the bottom of the manhole, it shall be lowered for the duration of the test. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blow out.

C. Vacuum Test Procedure

1. All manholes shall be vacuum tested prior to backfilling. After backfilling manholes shall be retested by vacuum test or exfiltration test. Vacuum test shall require the sealed manhole to hold a vacuum drop of 1" Hg over a period of time as described below.
2. Initial test pressure = 10" Hg (i.e. ± 20 " Hg absolute)
3. Test time for 1" Hg drop to 9" Hg
 - a. 2 minutes minimum allowable, for 0-10' deep manholes
 - b. 2½ minutes minimum allowable for 10'-15' deep manholes
 - c. minutes minimum allowable for 15'-25' deep manholes
4. If the pressure drop exceeds 1" Hg in the test time the manhole shall be repaired and retested. Repairs cannot include filling and pointing internal horizontal joint, boots, and pipe entrances.
5. If a manhole fails to meet 1" Hg drop in 1 minute after repair, the unit shall be removed and repaired or replaced as necessary.

D. Exfiltration/Test Procedure (If Allowed)

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

1. The manhole shall be filled with water to the top of the cone section. A period of time may be permitted, if the Contractor so wishes, to allow for absorption. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and the measuring time of at least 8 hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone; measuring the volume of water added. This amount shall be extrapolated to a 24-hour rate and the leakage determined on the basis of depth. The leakage for each manhole shall not exceed 1 gallon per vertical foot for a 24-hour period. If the test fails this requirement, but the leakage does not exceed 3 gallons per vertical foot per day, repairs by approved methods may be made as directed by the Engineer to bring the leakage within the allowable rate of 1 gallon per foot per day. Leakage due to a defective section or joint or exceeding the 3 gallons per vertical foot per day, shall be cause for the rejection of the manhole. It shall be the Contractor's responsibility to uncover the manhole as necessary and to disassemble, reconstruct, or replace it as directed by the Engineer. The manhole shall then be retested and, if satisfactory, interior joints shall be filled and pointed.

E. Infiltration Test

1. If after vacuum testing and backfilling the groundwater table is above the highest joint in the manhole, and if there is no leakage into the manhole as determined by the Engineer, such a test can be used to evaluate the water-tightness of the manhole. However, if the Engineer is not satisfied, the Contractor shall lower the water table and carry out the test as described hereinbefore.

F. Manhole Lining Visual Test

1. Thickness shall be verified with a wet gauge at random points of the new interior surface. Any areas found to be thinner than minimum tolerances shall immediately receive additional material.
2. Visual inspection shall verify a leak-free, uniform appearance.

END OF SECTION

SECTION 334100

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Submittals.
2. Reference standards.

- B. Work under this section includes construction of new and existing storm drainage piping, fittings and accessories including: pipe; wyes; tees; excavation (except rock); bedding; backfill and refill; furnishing, laying and jointing pipe; maintaining existing sewers, storm drains and service connections; connecting existing drain connections to new drains; abandonment of existing drain lines; clean-outs; and inspection and testing; as shown on the plans, as herein specified, and as directed by the Engineer.

- C. The work shall also include installation of magnetic locating tape over all storm drainage main, collector, and service lateral pipe installed on this project.

1.3 APPLICABLE STANDARDS

- A. The work in this section shall be performed in accordance with all applicable provisions of the following technical Reference Standards.

1. ASTM C 76 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
2. ASTM C 443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
3. ASTM C 924 - Practice for Testing Concrete Pipe Sewer Lines by Low Pressure Air Test Method.

1.4 SUBMITTALS AND CERTIFICATIONS

- A. Submittals and certifications for the following items of work in this section shall be furnished in accordance with Section 013300.

- B. Shop drawings and manufacturer's Certificates of Compliance shall be furnished for all pipe, gaskets, joints, fittings, linings, insulation, encasements, specials, and any other items specified in this Section.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

- A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10 (DN 80 to DN 250): AASHTO M 252M, Type S, with smooth waterway for coupling joints.
1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
 2. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.
- B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60 (DN 300 to DN 1500): AASHTO M 294M, Type S, with smooth waterway for coupling joints.
1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.
 2. Soiltight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

2.2 PVC PIPE AND FITTINGS

- A. PVC Corrugated Sewer Piping:
1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
 3. Gaskets: ASTM F 477, elastomeric seals.

2.3 NONPRESSURE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

D. Shielded, Flexible Couplings:

1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

E. Ring-Type, Flexible Couplings:

1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring

2.4 STONE BEDDING

- A. Stone bedding for storm drains shall be hand compacted in 6 inch lifts to the spring line of the pipe unless otherwise shown on the Contract Drawings. Stone bedding shall conform to ASTM Designation C33, Gradation No. 67 (3/4" to No. 4) as shown below:

| | |
|-----------------|-----------------|
| 100% passing | 1 inch screen |
| 90-100% passing | 3/4 inch screen |
| 20-55% passing | 3/8 inch screen |
| 0-10% passing | #4 sieve |
| 0-5% passing | #8 sieve |

2.5 SAND BLANKET

- A. Sand blanket shall consist of clean sand that is free from organic matter and so graded that 90-100% passes a 1/2 inch sieve and not more than 15% will pass a #200 sieve. Sand blanket may be omitted for cast-iron and ductile iron pipe provided, however, that no stone larger than 2" is in contact with the pipe and subject to approval by the Engineer.

2.6 TRENCH BACKFILL

- A. Suitable material for trench backfill in roads, road shoulders, walkways, and traveled ways shall be the natural material excavated during the course of construction, but shall exclude debris, pieces of pavement, organic matter, top soil, all wet or soft muck, peat, or clay, all excavated ledge material, and all rocks over six (6) inches in largest dimension, or any material which, as determined by the Engineer, will not provide sufficient support or maintain the completed construction in a stable condition.
- B. Suitable material for trench backfill in cross-country construction shall be as described above. The Contractor may use topsoil, loam, muck, or peat as suitable backfill material, subject to

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

approval by the Engineer, provided that the completed construction will be entirely stable and provided that easy access to the storm drains and culverts will be preserved for maintenance and possibly reconstruction, when necessary.

2.7 FILTER FABRIC

- A. Filter fabric shall be a nylon/polypropylene non-woven fabric. Filter fabric shall be MIRAFI 140 fabric as manufactured by Filter Industries, a division of Celanese Corporation, or acceptable approved equal.

2.8 MAGNETIC LOCATING TAPE

- A. Magnetic locating tape shall be installed on pipe runs.
- B. Detectable tracer tape shall consist of a continuous aluminum foil core inseparably bonded on both sides with tough high density cross-laminated plastic films, pigmented in orange, blue or other warning colors. Bond strength of the tracer tape must be such as to prevent pitting or degradation after 300 hours of continuous testing as per ASTM B-117.
- C. Detectable tracer tape shall be the type that can be located by the inductive method and does not require electrical connection to be made to the tape itself.
- D. Magnetic Locating Tape shall be installed on all sewer pipe installed on this project, without exception.
- E. The tape shall be six (6) inches in width and shall have the words "Buried Drain Line Below" permanently and indelibly printed on it.
- F. Prior to purchase of the tape and acceptance by the Engineer, a sample of the tape shall be furnished to the Owner and field tested by the Owner. No tape is to be purchased until it has been approved by both the Owner and the Engineer.

PART 3 - EXECUTION

3.1 HANDLING PIPE AND FITTINGS

- A. Storage of pipe, fittings, and accessories shall be as approved so as not to create nuisance or expose the pipe to damage. Damaged items shall be removed from the job site immediately.
- B. Pipe, fittings, and accessories shall be handled in an approved manner, using slings or other approved devices. No pipe, fittings, or accessories shall be dropped from trucks or into trenches.

3.2 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
 1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
 2. Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.
 3. Join nonreinforced-concrete sewer piping according to ASTM C 14 (ASTM C 14M) and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 4. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 5. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.3 EXCAVATION AND BACKFILL

- A. All excavation and backfilling for the installation of drainage pipe and end sections shall be in accordance with other applicable Sections and the Drawings.
- B. All backfill material adjacent to a pipe shall be approved soil. Backfill material shall be free from hard lumps or clods larger than 3-inch diameter, and free from rocks or stumps. Uniformly fine material shall be placed next to any pipe liable to dent or break.
- C. All backfill material shall be compacted at near optimum moisture content, in layers not exceeding 12 inches in compacted thickness, by pneumatic tampers, vibratory compactors, or other approved means. Care shall be exercised to thoroughly compact the backfill. Fill at the sides of the pipe may be compacted by rolling or operating heavy equipment parallel with the pipe, provided care is taken to avoid displacement or injury of the pipe. Material in the vicinity of pipes shall be compacted to not less than 95 percent of Modified Proctor density as tested in accordance with AASHTO T180, Modified Proctor.
- D. The CONTRACTOR shall place an adequate protecting cover of earth or other approved material over the structure before allowing equipment or traffic to pass over it.

3.4 PIPE PLACEMENT

- A. Proper facilities shall be provided for lowering the sections of pipe where pipe is to be placed in a trench. Each section shall be securely attached to the adjoining section by the approved method for the type of joint used.

END OF SECTION

SECTION 334413

CATCH BASINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. References.
2. Materials.
3. Precast masonry units.
4. Precast concrete sumps.
5. Mixes.
6. Laying brickwork and masonry units.
7. Plastering and curing brick masonry.
8. Setting inlets, grates and frames.
9. Plugging lift holes in sumps.
10. Catch basin traps.

- B. Work associated with this Section is found in other Sections of the Contract. The Contractor shall comply with all Sections of the Contract in construction of the elements of this Section.

1.3 REFERENCES

- A. ASTM A48: Standard Specification for Gray Iron Castings
- B. ASTM C32: Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
- C. ASTM C33: Standard Specifications for Concrete Aggregates
- D. ASTM C139: Standard Specification for Concrete Masonry Units for Construction of Catch basins and Manholes
- E. ASTM C150: Standard Specification for Portland Cement
- F. ASTM C207: Standard Specification for Hydrated Lime for Masonry Purposes

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type II
- B. Hydrated Lime: ASTM C207, Type S
- C. Sand: ASTM C33, Fine Aggregate, except all passes No. 8 sieve.
- D. Water: Potable
- E. Brick: ASTM C32, Grade SS, except that the mean of five tests for absorption shall not exceed eight percent by weight.
- F. Frames and Grates shall be Cast Iron, minimum Class 25 conforming to ASTM A48, and as follows:
 - 1. Castings to be free from scale, lumps, blisters, sandholes.
 - 2. Machine contact surfaces to prevent rocking.
 - 3. Thoroughly clean and hammer inspect.
 - 4. Capable of withstanding AASHTO H-20 loading unless otherwise indicated or specified.

2.2 PRECAST CONCRETE MASONRY UNITS

- A. Precast machine-made solid segments: ASTM C139, and following requirements:
 - 1. Use Type II cement except as otherwise permitted.
 - 2. Width of units as indicated.
 - 3. Inside and outside surfaces of units curved to necessary radius; interior surfaces of structures cylindrical, except top batter courses to reduce inside section of structure uniformly to required size and shape at top.
 - 4. Only full-length units required to lay any one course.
 - 5. Accept units on basis of material tests and inspection of completed product.

2.3 PRECAST CONCRETE SUMPS

- A. Precast concrete sumps: ASTM C478, and following requirements:
 - 1. Wall section not less than 6 in. thick.
 - 2. Use Type II cement except as otherwise permitted.
 - 3. Cured by saturated steam at temperature between 100 and 130 deg. F. for period of not less than 12 hours or, when necessary, for such additional time as needed to enable sections to meet strength requirements.
 - 4. Allow no more than two lift holes cast or drilled in each sump.
 - 5. Accept sumps on basis of material tests and inspection of completed product.

2.4 MIXES

- A. Mortar for Brickwork: Mix portland cement, hydrated lime and sand. Volume of sand not to exceed three times sum of volumes of cement and lime. Proportion cement and lime as directed; may vary from 1:1/4 for dense, hard burned brick to 1:3/4 for softer brick. Generally mix mortar in proportion of 1:1/2 : 4-1/2. Use sufficient water to form a workable mixture.
- B. Mortar for Masonry Units: Mix one part portland cement and two parts of sand by volume with sufficient water to form a workable mixture.
- C. Mortar for Plugging Lift Holes: Mix portland cement and sand 1:1/2, with sufficient water to make mortar damp, just short of "balling".

PART 3 - EXECUTION

3.1 LAYING BRICKWORK AND MASONRY UNITS

- A. Use clean units.
- B. Moisten bricks by suitable means, until neither dry as to absorb water from mortar nor wet as to be slippery when laid.
- C. Do not moisten concrete masonry units.
- D. Lay each brick in full bed and joint of mortar without requiring subsequent grouting, flushing or filling; bond thoroughly.
- E. Lay each masonry unit in full bed of mortar; bond thoroughly. Fill vertical keyways, completely, with mortar.

3.2 PLASTERING AND CURING BRICK MASONRY

- A. Plaster outside faces with mortar 1/4-in. to 3/8-in thick.
- B. Moisten brick masonry before application of mortar, if required.
- C. Spread and trowel plaster carefully.
- D. Check for bond and soundness after hardening, by tapping.
- E. Remove and replace unbonded and unsound plaster.
- F. Protect from too rapid drying by use of moist burlap or other approved means.
- G. Protect from weather and frost.

3.3 SETTING INLETS, GRATES AND FRAMES

- A. Set inlets and frames with tops conforming accurately to finished ground or pavement surface as indicated and directed.
- B. Set circular frames concentric with top of masonry.
- C. Set frames in full bed of mortar to fill and make watertight completely the space between top of masonry and bottom flange of the frame.
- D. Place a thick ring of mortar extending to the outer edge of masonry, around bottom flange. Finish mortar smoothly and give a slight slope to shed water away from the frame.
- E. Place grates in the frames on completion of other work at the catch basin.

3.4 PLUGGING LIFT HOLES IN SUMPS

- A. Plug lift holes in sumps, used for handling, with mortar. Hammer mortar into holes until dense and excess of paste appears, then smooth flush with adjoining surface.

3.5 CATCH BASIN TRAPS

- A. Traps shall be LeBaron, L-204 or equal.

END OF SECTION

**SECTION 343000
TRAFFIC CONTROL**

PART 1 – GENERAL

1.1 GENERAL

A. The following are considered to be part of the Traffic Control Plan:

1. MassDOT Standard Specifications
2. Work Zone Traffic Control Standard Plans
3. *Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition*
4. *Flagger and Uniformed Officer Use in Work Zones Policy and Guidelines*

The above referenced specifications, guidelines, and provisions herein provide minimum requirements and/or guidelines; the Contractor may be directed to expand upon the Traffic Control Plan if conditions warrant.

All Uniformed Officers shall have successfully completed a MassDOT approved course on *The Safe and Effective Use of Law Enforcement Personnel in Work Zones*. The officer shall supply proof of successful course completion upon request.

1.2 MAINTENANCE OF TRAFFIC

A. The Contractor shall meet the following requirements:

1. Portable Changeable Message Signs (PCMS) shall be used for advance notice of construction activities. The intent is to reserve the use of these signs for meaningful messages that will help motorists get through the work zone safely and not simply repeat information found on other Construction Signs. Message to be displayed shall be coordinated with the Engineer. Outdated messages shall be updated regularly in a timely manner to provide motorists with informative, current information on changes to daily traffic patterns, work locations, etc. Use PCMSs to advise motorists in advance of shoulder or lane closures associated with construction activities. Set the PCMSs up in advisory mode, one (1) week prior to beginning the work. Provide any other required signs compliant with MUTCD requirements, subsidiary to Item – Maintenance of Traffic.
2. For temporary markings and for traffic control, use the appropriate retroreflective paint pavement markings. Do not transition traffic on to the new phase/layout unless markings have been applied.

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

3. Painting of the single solid lines delineating the outside of the exterior lanes shall be applied to the binder and wearing courses as soon as possible or as directed by the Engineer. No offsetting of this line will be allowed.
4. Use reflectorized drums (barrels) for all channelizing tapers. Use 36" (minimum) cones (with 6" and 4" reflectorized bands) or 42" Tubular Marker (with three 4" wide reflectorized bands) for channelizing tangent sections. Banding shall be in compliance with the current MUTCD.
5. To improve operational sign visibility, the bottom of these construction signs shall be placed a minimum of 3' above the road grade in multi-lane areas and when signs are placed behind guardrail.
6. Workers' private vehicles shall not be parked within the Right-of-Way unless otherwise approved by the Engineer.
7. Work operations shall be discontinued whenever the Engineer determines traffic backups may contribute to either unsafe conditions or result in excessive delays for the traveling public.
8. Maintain access to businesses and residences at all times. Eliminate "lips" created with cold planing operations at the Contractor's expense. In the event that work must be completed at drives that precludes full access, the Contractor shall coordinate with the abutters to arrange the work at a time that minimizes inconvenience to the property owners/tenants.
9. Traffic shall be maintained on pavement at all times, unless otherwise approved.
10. Maintain permanent signing at all times.
11. No lane closures will be allowed on Sundays, Holidays, or the day preceding a Holiday unless approved by the Owner.
12. ADA compliant pedestrian access must be maintained on at least one side of the road through the work zone at all times where sidewalks are present. The minimum sidewalk width shall be 4'.
13. The minimum pavement width shall be 16 feet for one-lane, alternating two-way traffic. Restore to two-way traffic prior to non-work hours.

1.3 NOTIFICATION REQUIREMENTS FOR CHANGES IN TRAFFIC CONTROL

- A. The Contractor shall notify and provide information regarding traffic control operations to the area emergency services noted below (subsidiary to Item – Maintenance of Traffic). Particularly this includes operations that may block traffic flow temporarily through the work zone:

Project Number 21.926301.00
Pedestrian Safety & Traffic Circulation Improvements Project
Dracut Public Schools
Town of Dracut, Massachusetts

Emergency Service Contacts:

1. Town of Dracut, Fire Chief (Richard Patterson, 978-454-2113),
2. Town of Dracut, Police Chief (Peter Bartlett, 978-957-2123),

1.4 PROHIBITION OF UNNECESSARY TRAFFIC OBSTRUCTION

- A. The clear zone, measured out from the edge of the traveled way open to traffic, shall be 15 feet in areas of posted speed limits of 40 mph or less.
- B. Contractor's vehicles and equipment will not be allowed to remain on any local road outside of work hours.
- C. Work must be performed in such a way that does not adversely affect traffic from both sides of the roadway at any location at the same time.

1.5 VARIATION FROM THE TRAFFIC CONTROL PLAN

- A. If the CONTRACTOR feels improvements can be made to the Traffic Control Plan for this project, the CONTRACTGOR shall submit a written proposal to the OWNER and ENGINEER with any necessary plans for consideration and approval.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

- END OF SECTION -